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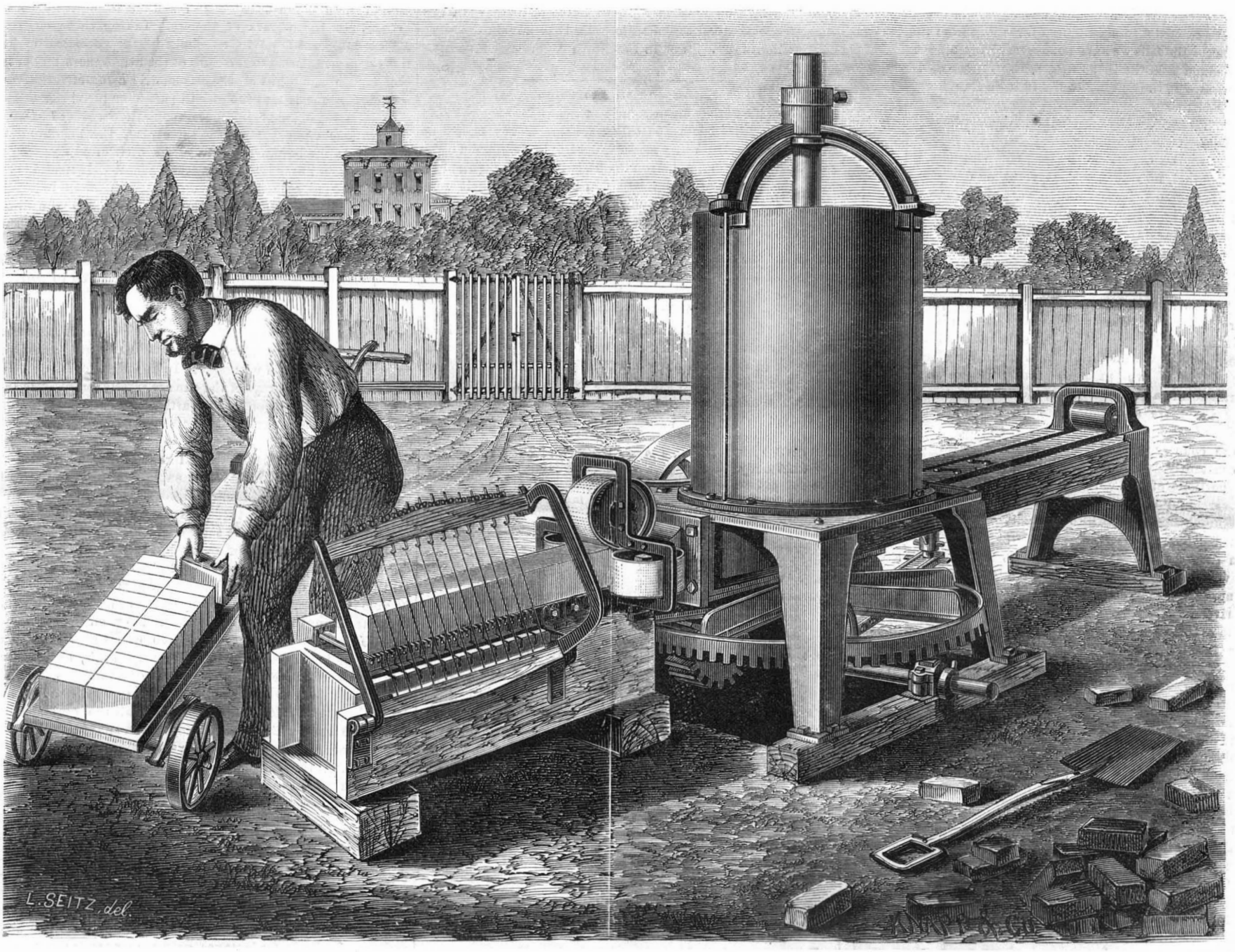
Improved Brick Machine.

The first notable event after the flood, narrated in sacred history, involves the manufacture of bricks. In that early stage of the world people understood the art of making bricks, even to "burning them thoroughly." Later we learn that the Israelites in Egypt had their lives made bitter with "hard bondage in mortar, and in brick, and in all manner of service in the field;" their annoyance at being deprived of the straw, and trouble of substituting stubble, we, in this age, do not practically understand, as we employ neither straw nor stubble in the manufacture of our bricks, unless "bricks in the hat," which are sometimes manufactured by the aid of straws in punches, juleps, etc.



THE HOTCHKISS AND BUSS' BRICK AND TILE MACHINE.

But brick making is one of the most ancient and always one of the most important of the industrial branches of mechanics. The convenience of handling in building, the wide distribution of the material, the durability of fabrics composed of them, make bricks a manufactured product always in demand and never out of fashion. There is probably no branch of manufacture on which more inventive talent and mechanical skill has been expended than on this.

The work of brick making by hand is very laborious. In the first place the material is heavy, difficult to detach from its bed; it is hard to form into shape until tempered with water, and every process from the digging of the clay to the production of the finished brick is unpleasant and monotonous. Here if anywhere it would seem that machinery might be usefully employed, as every step in the process of converting the crude clay into symmetrical bricks is purely mechanical. Yet few of the machines for this purpose have really fulfilled their design. The material, although apparently plastic and yielding, presents a powerful resistance to mechanical agencies. It contains not only water but air, and while a modicum of one is necessary to the production of the finished article, a very small amount of the other will render futile any attempt at a satisfactory result.

There are objections to the molding of bricks by machinery. One is the immense strain caused by the elasticity of the material; another the great power required in pressing to overcome the resistance of the air and fill the corners perfectly; and another that in consequence of this elasticity those portions first relieved from pressure spring, and the brick does not preserve a perfect form.

These objections are believed, by the inventors of the machine shown in the engraving to have been entirely overcome. The machine has no molds whatever. The clay is pressed through a die, or rather a matrix, in a continuous rectangular prism, the cross section corresponding in width and length with the bricks. The corners of the matrix are rounded, as it has been found by experiment that clay if forced into a perfect angular corner tends to "check" or crack. To insure, however, perfect corners the prism of clay as it comes from the lips of the matrix passes between rollers pressing on its top, bottom, and edges, and thus the corners are made sharp and well defined. From these rollers the mass is delivered to an endless apron or belt and carried forward under a hinged frame having wires stretched across from one side to the other, which, when the frame is brought down by the hand of the workman, cut the clay prism into bricks that may then be removed by attendants and hacked preparatory to burning.

The machine consists of an ordinary pug mill for the reception of the clay in which is an upright shaft, having curved radial arms and a spiral blade at the bottom, for mixing the clay and delivering it to a receptacle under the mill. This upright shaft and its blades are driven by a gear and pinion in the usual manner. The receptacle under the mill into which the prepared clay is passed is of rectangular form and is fitted with a plunger like the piston of a steam engine cylinder. This is operated by a pitman, one end of which connects with a wrist pin on the large gear under the mill and the other end to the end of the plunger, which is a long beam of wood traveling on friction rollers in a guiding frame. By this plunger the clay is forced through the matrix intermittently, its backward movement allowing time for cutting and removing the bricks. The air contained in the clay is forced out in the act of compression through minute apertures just in rear of the opening of the matrix.

By a change in the dies of the matrix the machine can be made to produce hollow bricks or drain tile of any form or size: and of either tile or brick, the machine, when worked by two horses, will make from 20,000 to 30,000 per day; and when worked by steam or water power its capacity is limited only by the limit of the work of feeding the mill and removing and hacking the bricks. Bricks made by this machine may be at once hacked eight or ten courses high without injury, thus saving the expense of an extensive yard and the danger of loss by storms, etc. The inventors say:

"This machine is so arranged that no obstruction of stone, gravel, or roots can possibly break or injure it; and from the rough clay, of whatever kind, shoveled into the hopper, it mixes and delivers the material in a better and more convenient shape to handle than any other machine. The clay is not cut or formed into brick until all pressure has been removed and it is at rest, ensuring a perfectly true brick, that will not warp or get out of shape in drying or burning, and come out of the kiln square and handsome. As a tile machine, this stands unrivaled in the market, for the rapidity and ease with which it works, the avoiding of all side pressure and friction, the longer length of stroke, and the freedom from grain or layers. The piston or plunger being worked by a crank or long pitman, entirely overcomes the side pressure and friction which all machines which use a cam to move the piston must have."

Patented April 30, 1867, and September 27, 1867. For further particulars address Geo. Herrick & Co., Room 1, No. 335 Broadway, New York city, who will furnish any further information desired, and exhibit specimens.

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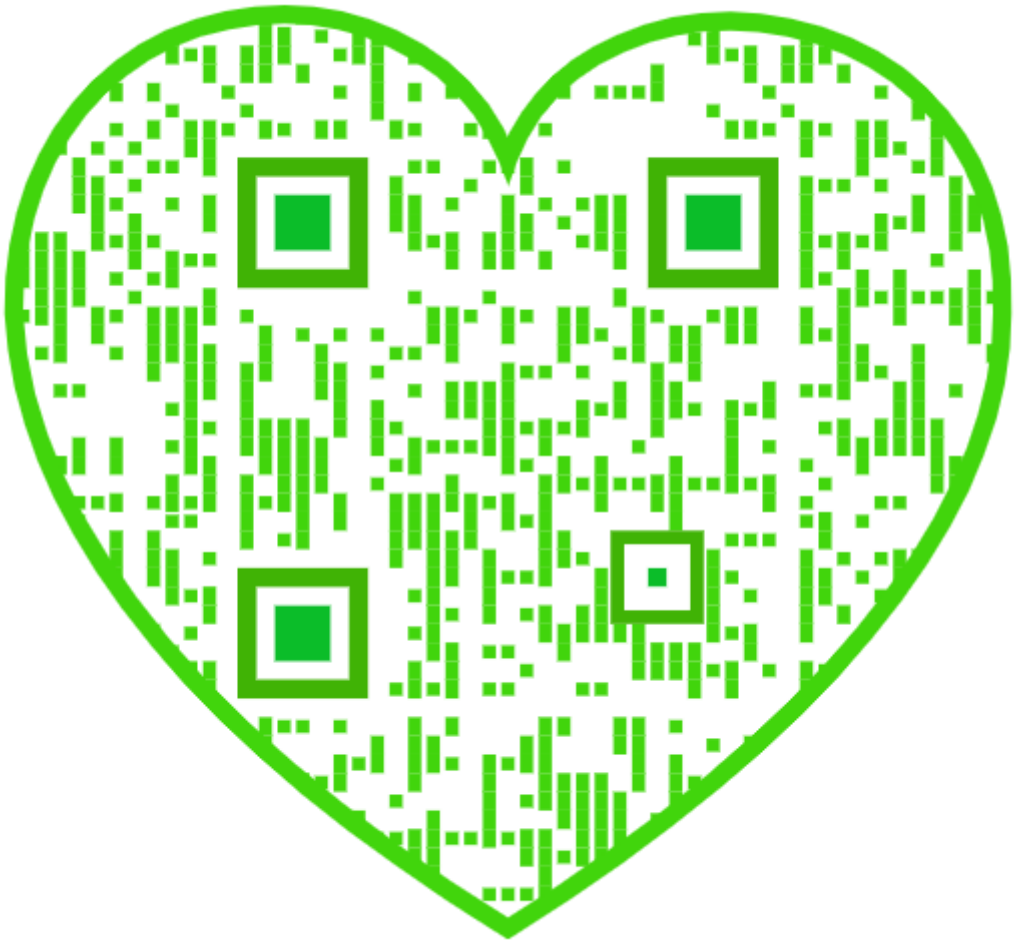

OBSERVATIONS ON THE GOLD FIELDS OF VENEZUELA AND GEOLOGY OF THE STATE OF GUAYANA, READ BEFORE THE LYCEUM OF NATURAL HISTORY OF N. Y., BY R. P. STEVENS, NOV. 2D, 1868.

Reported for the Scientific American.

Venezuela is divisible into three grand hydrographical basins, each of which represents distinct geological eras and holds its respective gold field.

The first, and oldest known, is the hydrographical basin of the Caribbean sea, and is separated from the Orinoco basin by the Coast Range of mountains. This range is the prolongation eastwards of the Cordillera Occidental, and geologically, is of the same age as that of the main Andes; viz., miocene tertiary—that is to say, these mountains are understood to be of several ages in their uplifts, the later being as late as the beginning of the tertiary. Fossils indicating this position have been found at Carupano, Maturin, and other points on the main land and on the Island of Trinidad, according to R. L. Guppy. The central axes of these mountains are metamorphic, and probably metamorphose palaezoic. Gold, silver, copper, lead, and other ores are found in their rocks.

In the absence of positive data, and reasoning by analogy from other portions of this range, the auriferous veins are as late in time as the Silurian, according to Prof. Forbes.

The hydrographical basin of the Orinoco is filled with much older rocks; viz., crystalline mainly, so far as known to our party, they are gneiss and gneissoid, save in the vicinity of Ciacoa, where tertiary obtains, no other rock has been seen. Some of our party have spent three years in this valley and we have crossed it in six different directions from the Orinoco, and below the falls we have not observed any other rock.

A section from the Orinoco, from the Village of Las Tablas southwards to the summit of the Imitaca Range reveals only gneissoid rocks.

Gold has occasionally been found in the streams flowing from these mountains, also along the Caroni, the largest southern affluent of the Orinoco, and along the Piraguay, a tributary of the Caroni, no valuable gold veins or deposits have ever been discovered. These rocks seem to conform to the general law; viz., to be barren of productive gold veins. (The West Canadian veins have not yet disproved this law). The Essequibo hydrographical basin is the true gold-bearing portion of the rocks of Guayana. So far as known the rocks of this basin are as follows: Gneiss on its northern rim (Imitaca Mts.); a few leagues south are low ranges of quartz and porphyry, Santa Cruz, Charapa, and Chagunemul Mountains. On their flanks are seen homblendic, silicious, and argillaceous slates. Gneiss with domes, or vast expansion of quartz veins succeeds. As we progress southward these domes of quartz form a very striking feature of the landscape. They are more abundant east of the Caroni river and south of the Imita mountains than any other portion of the country visited. They are always in sight. One is constantly winding around them or crossing some low portion of them. Sometimes their out-cropping rocks remind one of a distant cemetery with its slabs and monuments of white marble. One dome we have named "The Cemetery." The gneiss decomposes and then presents a mottled appearance, red, purple, greyish, and white in color. Dykes of granite, or more properly, syenite, appear at intervals. Approaching the valley of the Yuruary river—the northern affluent of the Essequibo—bands of white and light drab limestone are seen with the gneiss, and near Guasipati a band of itacolumite appears.

After crossing the Yuruary river, hills and low mountains of metamorphosed or semi-crystalline hills rise a thousand or fifteen hundred feet above the valley.

These mountains trend N. N.E. or S. S.W. They are composed of the following rocks: Brecciated schists, altered sandstones, quartz, and porphyry, a local rock of the aluminous family known as blue stone, and talcose schists. The porphyry in many instances is but a highly metamorphosed condition of the more silicious portions of talcose rocks. Talc and blue stone is the country rock of the gold veins of this portion of the Essequibo basin. Beside the rocks already described, there lie between the sources of the Yuruary and the Caroni a low range of hills running north and south which are composed of very black gnessoid schists and more solid rock dissimilar to the grayish gneiss of the Imitaca. These are older in geological time than the Imitaca, for the latter trend east and west and about upon them, while these trend north and south.

In order of time the following I suppose from present observations to be correct:

First, The black gneiss mentioned.

Second, Gray gneiss, quartzite, homblendic, and other slates, limestone and itacolumite, and all rocks trending east and west.

Third, The metamorphic rocks of the Morcupio, Ignan, and all rocks trending northeast and southwest south of the Yuruary river.

To return to the Essequibo basin. I have said that this is the true gold field of Guayana. As yet but very little is known of it. This basin is ninety leagues long, north and south, and eighty east and west, and for the most part densely covered with tropical forests and destitute of inhabitants, save a few uncivilized aboriginals who live along the banks of its streams.

Gold has long been known to be found along the head waters of its streams. in the Parima, Tucumacare, and other mountains. An English company commenced operations upon the Essequibo, above the junction of the Cuzuni, penetrating from Georgetown, British Guiana. Carlos Seigert, a German mining engineer, has descended the Yuruary to the Cuzuni, and descended this stream to the Puebla of Arechica, und reports gold quartz along both streams. The Mocupio valley has been worked since 1854 and has been only penetrated four miles. The Iguana has been touched only in a still smaller portion. Only this and no more do we know of this gold field.

In the Mocupio valley gold is found under the following modes or conditions.

First, In the sands and gravel beds of the streams of the valley.

Second, In paydirt beds on bed rock in the alluvial of the valley, and in the clays derived from the breaking down and and decomposition of the country rock of the veins.

Third, In quartz veins under different conditions as follows: *a*, in pure white quartz in granules and nuggets; *b*, in rusty and ochraceous quartz invisible to the naked eye; *c*, in thin bluish and greyish threads and films of talc in the quartz; *d*, in crystals of sulphide of iron mechanically mixed with the pyrites; *e*, attached to the walls of decomposed and removed crystals of pyrites; *f*, in the ochre resultant of such decomposition; *g*, in thin, film-like scales on the face of fissure walls; *h*, in masses cementing fragments of gangue rock together.

Fourth, in the foot and hanging walls of veins the "cacasjo" of the country.

There are two systems of veins, one running northeast and southwest, the other east and west. In both of these there is a variation of from ten to thirty degrees. Which of these systems is the oldest we have not yet determined.

In the present stage of our investigations we consider this gold field with its metamorphosed rocks to be older than the palaeozic, older than the talconic, older than any on the west coast of South America or on the North American continent.

S.

Food Estimated in Horse-powers.

Dr. Frankland has made some researches into the calorific values of food. From the calorific value of any article of food it is assumed that its working energy in the human body may be correctly estimated, on the basis that heat required to raise one pound of water one degree of Fahrenheit represents a mechanical force sufficient to raise 772. lbs to the hight of one foot. This can readily be reduced to horse-powers. Who knows but that articles of food may be estimated by the coming grocer upon this method. Imagine a farmer taking his butter to market, and being asked by the would-be purchaser, how many horse-powers of butter he has to sell; how many horse-powers of cheese he has in his wagons. Or fancy Mrs. Malone asking said grocer "how chape he can sell a quarther of a horse-power o' whishky to a poor woman that hasn't any cow?"

But joking aside, Dr. Frankland's computations are valuable. The following table embodies some of their results:

ACTUAL ENERGY *of Ten Grains of the Material in its Natural Condition, when completely Burnt in Oxygen, and when Oxidized into Carbonic Acid, Water, and Urea, in the Animal Body.*

	Per cent of water in material.	LBS. LIFTED 1 FT. HIGH — When burnt in oxygen.	When oxidized in the body.
Butter	15	14,357	14,357
Cheshire cheese	24	9,187	8,613
Oatmeal	15	7,993	7,769
Wheat flour	15	7,788	7,591
Pea meal	15	7,778	7,456
Arrowroot	18	7,781	7,731
Ground rice	13	7,535	7,424
Yolk of egg	47	6,761	6,532
Lump sugar	19	6,616	6,616
Grape sugar	20	6,476	6,476
Entire egg	62	4,708	4,507
Bread crumb	44	4,409	4,246
Ham	54	3,915	3,317
Mackerel	71	3,537	3,187
Lean Beef	71	3,098	2,818
Lean veal	71	2,594	2,314
Guinness' stout	88	2,123	2,123
Potatoes	73	2,002	1,969
Whiting	80	1,787	1,563
Bass's ale	88	1,530	1,530
White of egg	86	1,325	1,138
Milk	87	1,305	1,241
Carrots	86	1,040	1,026
Cabbage	89	853	830

It will be understood, of course, that to obtain these results in the animal body the materials must be completely absorbed, and fully oxidized into carbonic acid, urea, etc.

Estimated in this manner, it may be said that a daily subsistence diet of 2 ozs. of dry nitrogenous food, and 13·2 ozs. of dry carbonaceous, calculated as starch, and a daily working diet of 6 ozs. of nitrogenous matter, and 26 ozs. of dry carbonaceous, have the following mechanical energies:

	LBS. LIFTED 1 FT. HIGH — When burnt in oxygen.	When oxidized in the body.
Subsistence diet	6,319,783	6,307,078
Working diet	13,349,405	13,511,290

But the actual working power of the human body does not approach this. In fact, although a man's daily labor has a very large range, as from 300,000 foot-pounds when lifting dung into a cart to 1,500,000 foot-pounds when pushing or pulling horizontally, yet the average is not above 1,000,000 foot-pounds, as will be seen from this diagram:

KIND OF LABOR.	AM'T OF WORK in foot-pounds.	AUTHORITY.
Bricklayer's laborer carrying bricks	1,627,200	Mayhew.
Coal whipping	1,293,600	"
Ascending Faulhorn	1,074,931	Wislicenus.
" "	933,746	Fick.
Treadmill	1,008,000	Mayhew.
"	861,156	Ed. Smith.
Turning a winch	837,760	Coulomb.
Pedestrians (20 miles a day)	792,000	Haughton.
Paving and pile driving	788,480	Coulomb.
Porters carrying loads	732,480	"
Shot drill punishment	694,400	Haughton.
Average	967,614	

And even when we add the calculated internal work of a man's body, as the beating of the heart and the movements of respiration, the total of it does not much exceed 1,500,000 foot-pounds a day:

	FOOT-POUNDS.
External work or actual labor	967,614
Work of circulation (75 beats a minute)	497,880
Work of respiration (15 a minute)	98,064
Total ascertainable work per day	1,563,558

It is evident, therefore, that a large portion of our food must escape digestion and absorption; indeed, the thermotic power of the food actually consumed daily, as estimated by the carbonic acid exhaled and the urea secreted, is not more than sufficient to raise the temperature of 10,000 pounds of water 1° of Fahrenheit. This is equal to a force of 7,720,000 pounds lifted a foot high; so that the ascertainable work of the food is about one fifth of its actual energy, the rest of the power being consumed in molecular movements within the animal body. Helmholtz asserts that the external work should be a fifth part of the mechanical force of the digested food; but labor must be well applied to develop this proportion of its energy.

LUNAR ASSISTANCE.

Suppose for a moment, that we are all transported to the bottom of the sea, there to occupy a position analogous, in respect to the waters of the ocean, to the position we hold in the lowest portion of the atmosphere. How can we form any idea of the tides that ebb and flow above us? Our only way of obtaining cognizance of the fact would be to measure the thickness of the mass of water over head, by means of some instrument analogous to the barometer.

Let us now go up again to the surface of the earth—to the bottom of the aerial ocean which covers the whole earth. The same observations, made with the barometer, acquaint us with the existence of tides in the atmosphere. But here we have a continuous ocean, whose oscillations, restrained by no barrier, are not amplified by confinement in a narrow channel, as happens in the oceans of waters, through the resistance which continents oppose to their movements. We have, moreover, an ocean consisting of a fluid incomparably less dense than the waters of the sea. Taking these circumstances into consideration, we find that the periodical variations of pressure, due to the tides of the atmosphere, ought to occasion, in the hight of the barometric column, variations amounting, at most, to the fiftieth part of an inch!

What, now, of lunar influence upon the weather? Daily observations show that, in the same place, the hight of the mercury in the barometer may vary a quarter of an inch or more, without any great disturbances ensuing. If the tides in the atmosphere, caused by the moon, have any share in these variations, it must be so very small that certainly it cannot authorize weather prophets to found their predictions upon changes of the moon.

But if the moon will not enable us to foretell rain or sunshine, she does help us to fix historical dates and to correct our ancient chronology.

In an eclipse of the sun, the moon screens the sun, either totally or in part, from certain portions of the earth's surface. Here it is total or annular; there, it is only partial; further on, not a trace of it is witnessed. In an eclipse of the moon, on the contrary, the rays of the sun are totally or partially intercepted from the moon by the earth's interposition; and this privation of light is seen in the same way from all points of observation.

The ancients (who had nothing like so precise a knowledge of the moon's movements) were unable to predict eclipses of the sun. They foretold lunar eclipses only; basing their predictions on the fact that these eclipses are reproduced almost periodically, presenting the same characters and the same intervals between each other, every eighteen years and eleven days. It therefore suffices to have observed and registered all the eclipses of the moon happening during that period, to be able to announce with certainty the eclipses which were to occur during the period following. Now, on the contrary, with the much more exact information which we possess, not only of the moon's motions but also of the sun's, we are in a position to calculate and announce a great many years and and even centuries beforehand, both the general circumstances of lunar and solar eclipses, and also all the peculiarities which the latter will present at any given spot on earth. In like manner, by a retrospective examination, we can give an account of all the circumstances accompanying ancient eclipses in this or that locality.

Eclipses of the sun are somewhat more frequent than those of the moon. But as a solar eclipse can never be visible over so large a portion of the earth's surface as a lunar eclipse, it follows that, for any one given spot, solar eclipses are least numerous. And if, instead of noting all solar eclipses, we only reckon those which are total, we shall find that at the same spot, they are very far from numerous. We may even say that, for any determinate locality, total eclipses are veritable rarities. In Paris, for instance, only one was seen during the whole of the eighteenth century—the eclipse of 1724. In the nineteenth century there has not been, nor will there be one. The Londoners were five hundred and seventy-five years without one total eclipse—from the year 1140 to 1715; and since 1715 they have witnessed no similar spectacle.

If history mention a total eclipse of the sun as having been observed at a given spot, without giving the precise date of the observation, that date may still be determined by the exact knowledge we now possess. Recurring to the epoch to which the phenomenon belongs, we successively pass in review the different solar eclipses which occurred during a lapse of years of such extent, that we are certain it must comprise the year in which the eclipse in question was observed. By proceeding in this way we shall generally find that, out of all those eclipses, there is only one corresponding to that recorded in history; because that one only can possibly have been total at the spot where the observation was made. We shall thus get, not merely the year, but the day and even the hour of the observation.

Take an example. Herodotus relates (book i. § 74), "After that, the Lydians and the Medes were at war during five consecutive years. In this war the Medes frequently vanquished the Lydians; the Lydians also often beat the Medes. On one occasion they even fought by night. Now as the

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war continued with equal chances on either side, in the sixth year, one day when the contending armies were engaged, it happened that, in the midst of the strife, the day was suddenly changed into night. Thales of Miletus had foretold this phenomenon to the Ionians, indicating the exact year in which it actually did take place. The Lydians and the Medes, beholding night suddenly interrupt the day, put an end to the combat, and thought only of settling the terms of peace."

The eclipse here referred to is known as Thales' eclipse. The various authors who have mentioned it have assigned to it very different dates, from the 1st of October, 583 B. C., by Scaliger, to the 3rd of February, 626 B. C., by Volney. Professor Airy, by proceeding as indicated above, and taking advantage of the most recent data respecting the lunar movements, has decided that this eclipse occurred on the 28th of May, 584 B. C.

Between the earth there exists one grand difference. The earth has an atmosphere; the moon has none. She has no clouds, snows, nor dews—contrary to the theories of the elder astronomers. Kepler and Galileo held the moon to be encompassed with a heavy and elastic atmosphere: alleging, among other proofs, that the moon sometimes disappears in a clear sky, so as not to be discoverable by the best glasses (of that day): little stars of the fifth and sixth magnitude remaining visible all the time.

Kepler says he has observed this phenomenon twice—once in 1580, and once in 1583. Hevelius did the same in 1620. Riccolus and other Jesuits, at Bologna, and many people throughout Holland, observed the like on the 14th of April, 1642. And yet at Venice and Vienna, the moon remained all the while conspicuous. On December 28, 1703, there was a total obscuration of the moon, which must not be confounded with an eclipse. At Arles, in France, she first appeared of a yellowish brown; at Avignon, ruddy and transparent, as if the sun were shining through her. At Marseilles, one part was reddish the other very dusky; "and at length, although in a clear sky, she wholly disappeared." Here it is evident, they say, that as the colors appear different at the same time, they do not belong to the moon herself, but are occasioned by an atmosphere around her, variously disposed in this and that place, for refracting these or those colored rays.

Lord Rosse's telescope has stripped the moon of her atmosphere, leaving us still enveloped in ours; and we have only to observe what is daily passing before our eyes to understano the changes which the atmosphere has produced on the solid crust of our globe. The hollows are filled up and smoothed over by sedimentary deposits brought down by rains; the relief of our surface is gradually worn down. The moon is as as a medal fresh from the mint; the earth is as a shilling which has sustained the effects of passing for years and years from pocket to pocket.—*All the Year Round.*

The Loom and the Anvil.

In confirmation of what we urged last week, the Augusta, Geo., *Constitutionalist* very truthfully remarks, that "the best allies of the South are near at home. They are the plow, the loom, and the anvil. They are the implements of industry in all the departments of labor. The strong arms of industrious laborers are the true redeemers of our land from depression and impoverishment. Those who are willing to work and to make labor respectable and respected, are the practical patriots of the emergency.

"Nor need it be feared that Gen. Grant will bring his influence to bear against the material prosperity of the Southern States. As a war measure he aided in desolating the South with fire and sword. But since the war he has expressed no sentiment of vindictiveness against our section. There is reason to believe his sentiments are not hostile to us. At the time of the surrender he manifested a liberal spirit toward the army and people he had conquered. He has at no time since indicated a change of temper."

MANILLA cigars are made by female children and adults. The mode of making the cigars differs materially from that employed in this country. The tobacco passes through a dozen hands. After the filling and wrapers are assorted, one set of girls select the filling and arrange it in proper order, another set trim the wrappers, a third roll the wrappers about the filling, while a fourth stand by with their fingers in a pot containing paste or mucilage manufactured from a plant which grows in luxuriance on the island. At a proper time a girl, with a dexterous wipe, applies the gummy substance to the edge of the leaf, and the operator, by a peculiar twist of the wrist, brings the edge down upon the cigar, and casts it into a basket on the opposite side of the table. There are eight manufactories in Manilla, enploying twenty-five thousand women and girls, whose wages average seven cents per day.

HOW TO TAKE CARE OF TEETH.—We think it safe to say that a majority of people pay too little attention to their teeth; and the result is that dentists find plenty of employment, and numerous are the diseases of the teeth and gums. The teeth should be cleansed at least twice a day with a soft tooth powder (precipitated chalk is the best) and a little soap. Unless this care is taken tartar is liable to form upon them, and if suffered to accumulate it causes inflammation and absorption of the gums and gradual loosening of the teeth, which can only be prevented by observing the above simple practice. When tartar, which is a deposit of salts of lime and organic matter from the saliva, is allowed to accumulate it becomes hard and can only be removed by the scaling instruments of the dentist.

THE Welsh puddlers and other operatives at the Tredegar Iron Works, Richmond, Va., are on a strike in consequence of an attempt to reduce their wages.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Keeping Boilers Clean---Surface Blowing-off.

MESSRS. EDITORS:—Being a subscriber to your paper and enjoying its benefits, I thought I would send you my experience in cleaning boilers. I have charge of a large boiler and engine, and have tried various ingredients to take off the scale but without much success till this summer, when, changing my exhaust pipe, I put a tunnel on the top of the pipe to catch the water, and conveyed it by a half-inch gas pipe to the reservoir from which I fill my boiler after blowing off. The result is that the two last times I blew off I was bothered with the blow-off pipe clogging; especially the last time, when the pipe clogged under forty pounds pressure, so that I had to turn the plug several times before I could get the boiler empty. When empty I opened the mud pipe and found it full of scale from all parts of the boiler, some of the pieces being a quarter of an inch thick.

The boiler is now almost perfectly free from scale, and what little there is is loose and will blow off the next time I empty the boiler.

I have used the same water that has always been used in the boiler, and I attribute the loosening of the scale to the oil that I use in oiling the cylinder, incorporated in the exhaust water, which I use only when filling the boiler after blowing off. I expected when I tried it that the boiler would foam but was disappointed.

I have a surface blow-off. I took some 2-inch pipe and cut it in lengths so that I could get it through the man-hole, and had ¼-inch holes bored in half of its circumference, and laid the pipe lengthwise of the boiler on pieces of iron about two inches above the flues fastening it with wire. I run the end through the front of the boiler with 1-inch pipe and attach a globe valve. I have it blowed off five or six times a day and the amount of dirt that is blown out is incredible. The boiler is five feet in diameter with ninety-four 3-inch flues, and I use Lake Erie water. G. L. B.

Rochester, N. Y.

[The experiment of our correspondent is one which we recommend to all our readers who have to feed their boilers with "hard" water. Save the drippings of the exhaust pipe, the condensation of the safety valve blow-off, and that from the cylinder, and use the water thus obtained to fill the boiler after blowing off. The result will be surprising in its effect in loosening scale. For this reason—the change of quality of water—our Sound boats are seldom troubled with scale, as at each end of the route fresh water is used to fill the boilers.

The idea of a surface blow-off pipe is one we can also highly commend, having employed a similar device with good results several years ago.—EDS.

Old Fashioned Lathes.

MESSRS. EDITORS:—In your issue of October 21st, W.W. T. wants a rule for "old fashioned lathes of four gears." Here is one. Suppose nine threads are to be cut and the leading screw four to the inch. Select any two wheels, say 50 and 60 teeth; then to find the other two, put them in the form of a fraction, thus $\frac{50}{60}$; reduce them to their lowest terms, $\frac{50}{60}=\frac{5}{6}$. The number of threads to be cut and number on the leading screw are to be put in the same way, thus, $\frac{9}{4}$; multiply the first by the last, thus, $\frac{5}{6}\times\frac{9}{4}=\frac{45}{24}$, the product being the two wheels sought, one of which is put on the live spindle and the other one the screw. The live spindle being the denominator, the wheel of 24 teeth is placed on it; the denominator of the other pair, 60 teeth, comes next, working in the 24, the numerator of the first pair; 50 teeth is next, and the numerator of the last, 45 teeth, on the screw. Then we have them this way: Spindle, 24; inside of stud, 60; outside of stud, 50; screw, 45. W. D. YOUNG.

Pittsburg, Pa.

Oiling Harness.

MESSRS. EDITORS:—Having seen numberless processes in your valuable paper for preserving and cleaning harnesses, I would like to add my experience to the list if worthy the space it occupies.

In the first place, I subject the harness to one or two coats (as the leather may need) of lamp black and castor oil, warmed sufficient to make it penetrate the stock readily. Then I make about two quarts of warm soap suds and with a sponge wash the harness. When dry, rub it over with a mixture of oil and tallow, equal parts, with sufficient lamp-black to give it color, or, what is better, prussian blue, which gives it a new and fresh look. This compound should be applied sparingly and well rubbed in, which can be quickly done and will leave a smooth and clean surface.

The advantages I claim for this process are these:

First, By saturating the stock in the first place with oil, the soap and water are prevented from penetrating it in the process of washing. When leather is permitted to absorb water or soap it has an ultimate tendency to harden it.

Second, When the harness is washed *first* (as is generally the case) the water repels the oil; consequently in the one case you have the oil inside of the stock, and in the other you have the soap and water.

Third, By oiling first it softens the dirt, so that it can be washed off in at least one-half the time required when washed before oiling, and also saves the "scraping" process which defaces the grain of the leather.

Fourth, It will remain soft much longer from the fact of its being penetrated with oil.

Fifth, The whole process can be accomplished without the delay of waiting for it to dry.

Consequently the harness can be oiled and cleaned in much less time, will remain soft longer, wear longer, and look better than when cleaned by the old method. And I consider these reasons of sufficient importance for every one having a harness to give this method a fair trial. E. D.

Stoughton, Oct. 23, 1867.

Expansion of Ice.

MESSRS. EDITORS.—In the SCIENTIFIC AMERCIAN of the 11th inst., I noticed an article on the Expansion of Ice. Several years ago my attention was called to this subject by Prof. Faraday, who said that water expanded at the freezing point, but said it was still a mystery and it seemed to me to be in contradiction to the laws of nature to make cold expand water when it contracted everything else. Therefore I set to work to see if possible what was the cause. I have felt deeply interested on the subject, and tried experiments, searched philosophy, watched for all that was said or written on the subject, read Dr. Tyndall's lectures to see if he, with all his vast store of knowledge and deep philosophy, gave an explanation of it; but I was disappointed, as I found nothing which appeared to meet the demands of the case. And now as the subject is under discussion in England, I thought I would give you some of my observations on the subject. I had no means of testing the matter, but watched the changes and appearances of water when being frozen; and I always found that there were myriads of little bubbles continually rising to the surface. When the water was in a vessel, these small bubbles would make their appearance on all parts of the vessel, small at first but continually increasing in size as the freezing went on, until they become large enough, or rather I suppose light enough, to rise to the surface; these would come to the top, burst, and disappear if the ice had not formed over the surface, but as soon as the top was covered with ice, they could not escape, but come up and touch the under side of the ice and there remain. The water around them would be frozen in turn leaving these air cells there, which are seen in all ice and give it a honey-comb appearance, leaving it lighter than the same bulk of water before frozen and causing ice to float on the top of the water. The only thing now is to show how these air cells are produced, for it is evident to my mind that the water does not increase in bulk nor yet the ice, but that they are forced apart by the expansion of this air contained in the cells. As a liquid is being changed to a solid it throws off heat, and I incline to think this heat is what enters the air (which all water contains) and thus it becomes expanded and may expand sufficiently to burst the ice.

There is also another agent (electricity) which is excited by the condensation of water or ice. This powerful fluid would itself be sufficient to burst the ice and any vessel which might contain it. Is it not more reasonable to think this air is expanded than that cold the condenser of every thing else should expand water and ice because it gives that appearance? I hope these remarks may be of some interest to some of your readers, and lead to further investigations.

Tarrytown, N. Y. C. D. SUTTON.

[We have given place to our correspondents views; but will add that the question now in dispute is not whether water expands when freezing. It is whether ice *after it is ice* expands or contracts as the temperature is diminished.—EDS.

Solidification of Water by Pressure.

MESSRS. EDITORS:—I noticed in the SCIENTIFIC AMERICAN of October 28, an article on solidifying of water by pressure and sounding of the ocean.

An experiment was made some years ago (by whom I do not recollect) in regard to the pressure of water at a given depth. A large bottle was procured, with a tapering cork so fastened that it was impossible to come out. It was then sunk to a depth of 3,000 feet; and, after a short interval, drawn to the surface, the cork was found to be forced into the bottle, the bottle filled with water, and the cork forced back into the neck of the bottle perfectly tight. And that, with some other events, has given rise to the theory that bodies, after sinking to a certain depth, remained suspended in the water—the pressure of the water on all sides being equal. The principal question is, Is there an equal pressure of water at any given depth? If so, that is if there is an equal pressure at a given depth, the theory of suspension is possible as well as probable.

Waterford, Minn. J. S. NICHOLS.

[Our correspondent seems to be ignorant of the truth that, at any point beneath the surface of a liquid, the pressure is equal in all directions. Bodies do not sink by virtue of the pressure of the medium through which they sink, but by virtue of their superior gravity. The bottle experiment is an interesting one in many points of view, but we cannot see that it bears in any way upon the subject of the solidification of water by pressure.—EDS.

Prime Numbers---A Prize.

MESSRS. EDITORS:—I will give one thousand dollars to the first person who, within one year from date, will give a correct rule for detecting prime numbers. Said rule must apply to all prime numbers to their utmost extent.

Biddeford, Me., Nov. 9, 1868. GEORGE S. MCINTIRE.

[We can assure our correspondent, in advance, that he may rest perfectly secure in the possession of his thousand dollars—mathematicians, ancient and modern, have worked long and hard at this problem, but, like the perpetual motion, it won't go.—EDS.

IN tempering metals an exact series of experiments has proved that the following colors are produced at the temperatures given: Very pale yellowish by 430°; pale straw, 450°; yellow, 470°; brown, 490°; mottled brown, 510°; purple, 530°; bright blue, 550°; blue, 560°; dark blue, 600°.

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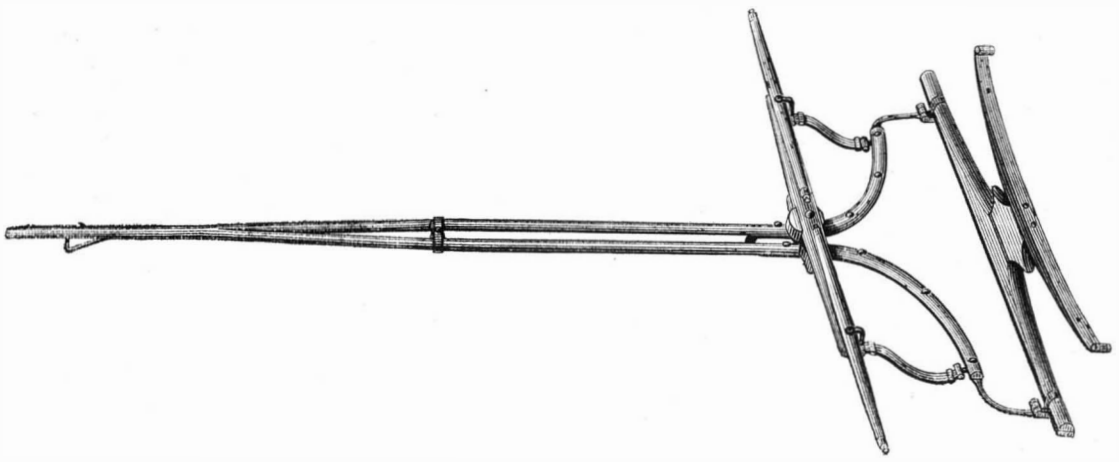
Improvement in Carriage Tongues or Poles.

The pole represented in the accompanying engraving is intended as an improvement and a substitute for the heavy carriage poles in ordinary use, the weight of which is galling to the necks of horses without a corresponding advantage in strength. This, it is believed, combines lightness and strength. The pole is formed of two pieces, or two separate poles connected and secured at the forward end by a metallic sheath or other means, and spread apart and thus held, by a block and strap between the front end and the spilnter bar. Here they are fastened to a block and then curved downward and outward, diverging on each side to receive the bolt of the clips on the forward bolster. The downward curve is so calculated as to give the proper elevation to the pole, while the vehicle may be turned short without bringing the back ends of the pole in contact with the elliptic spring. An iron strap, the ends of which form eyes for the reception of the bolts passing through the ears of the clips, serve to strengthen the pole, as it extends beyond the splinter bar in one piece, the two branches being united. The device is recommended to the attention of our carriage makers.

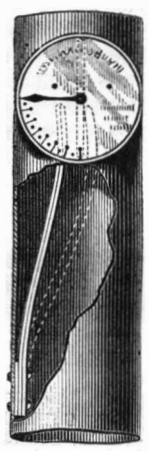


MITCHELL'S PATENT CARRIAGE POLE.

Patented through the Scientific American Patent Agency, April 7, 1868, by V. N. Mitchell, who may be addressed for the purchase of rights, etc., at Concord, Cabarras Co., N. C.

TAMKIN'S AUTOMATIC HEAT DAMPER.

The ingenious device shown in the engraving is designed to control the draft of a fire, or rather the escape of the products of combustion, automatically, by the heat of these products. The principle is the well known one of the variableness in the expansion of different metals by differing degrees of temperature.



The damper is the ordinary disk generally introduced into stovepipes, attached to a stem or axis to one end of which a pointer is attached. The other end may have a thumb piece, if considered necessary, as usual. On the pointer side of the pipe is affixed a dial or a sector with marks to indicate by means of the pointer the position of the damper, and if required, the degrees of heat. This is operated by a composite spring, one end of which is riveted to the funnel or pipe and the other end brought in contact with the plate of the damper. The spring is made of two metals of unequal expanding power, as copper and iron, that of the least expanding quality nearest the damper; one side of the damper, that against which the spring impinges, being slightly weighted.

The operation is thus: When there is little or no heat in the flue or pipe, the damper, from being slightly weighted on one side, will hang vertically, but as the heat increases the copper portion of the spring rapidly expands and the spring is curved, impinging on the damper, until, as the heat is sufficiently increased, the damper will be approximately closed, as it is not intended that no room whatever shall be left for the escape of the products of slow combustion. This invention is designed more particularly for stoves and other household warming apparatus, but may be applied to sugar houses, paper mills, etc., where regulation of the heat and the saving of heat is important.

Patented through the Scientific American Patent Agency, September 29, 1868, by George Tamkin, who may be addressed at 251 Water street, Newburgh, N. Y.

PROF. DOREMUS ON THE CREATION.

On the evening of the 9th instant, R. Ogden Doremus, Professor of Chemistry in the *Bellevue Medical College*, and in the *College of New York City*, gave at Lyric Hall, Sixth avenue, an interesting lecture on the "Creation according to Chemistry, Geology, and Astronomy, as compared with the Mosaic Record."

After referring to the motions of the earth, and the general belief that the earth consists of a hollow crust filled with molten matter, the lecturer reviewed the theory that the matter now composing the earth's mass was originally in a gaseous state and that by gradually cooling it has become first liquefied and subsequently solidified. The planets and the sun were also at the same period gaseous. The lecturer illustrated this part of the subject by some very interesting experiments with gaseous bodies, which were shown to be capable of change from gaseous to fluid states, and from that to solid form.

He claimed that the scriptural account, "the earth was without form and void," was as forcible an expression of the views of scientific men in regard to the chaotic period as could possibly be framed.

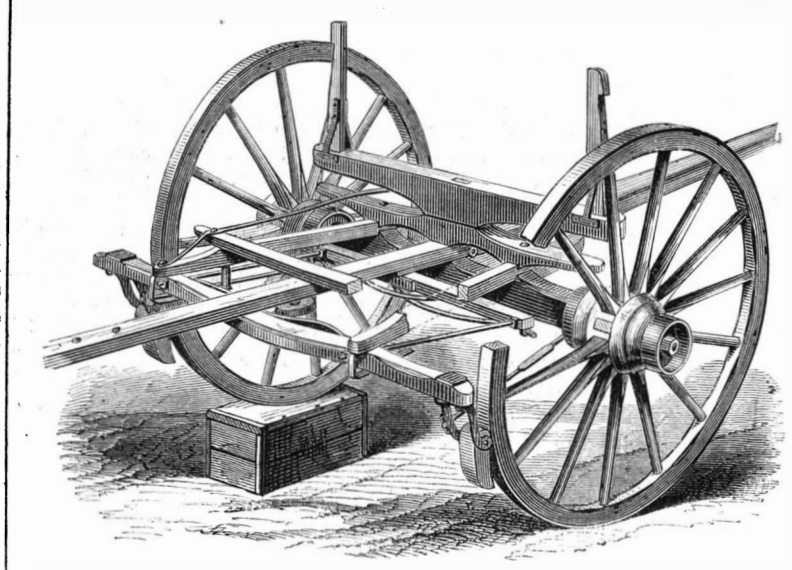
On the subject of the creation of light the lecturer dwelt at length, discussing its nature and the methods of determining the nature of the sources from which we obtain natural light. By the spectroscopic method it has been determined that solar light is produced by the combustion of matters similar to those found upon the surface of the earth. More than this, forty stars have also been examined in the same manner with like results. The lecturer stated that while the earth was in a state of incandescence it was also self-luminous, and that its luminosity diminished with its temperature until now it shines only by reflected light. Professor Doremus also made some remarks upon artificial illumination, among which he stated that the recent experiments in France have established the fact that pure oxygen and hydrogen in their combustion give the strongest light of any yet artificially produced. He then traced the gradual progress of the formation of the earth and living beings up to the present period. On this head he remarked that the whole geological history of the world was a process of gradual preparation for the advent of mankind, and that the Mosaic record, which places man as last in the order of creation, was in exact accordance with the teachings of modern geology.

The present condition of the earth indicates a long duration, and he maintained that science shows our race to be only in its infancy.

The lecture is the first of a series of four to be delivered by Prof. Doremus, and was largely attended and attentively listened to.

LADENBERGER'S PATENT WAGON BRAKE.

For heavily loaded teams a brake for holding the load and relieving the animals is so much a necessity that almost all the conveyances of freight over uneven roads are provided with them. Usually they are operated by the hand or foot of the driver; but in critical positions his undivided attention should be bestowed upon his horses, which is impossible when he must, in addition, govern the brake. Automatic devices have been invented to relieve the driver, but they have not always proved satisfactory in actual use. The engraving accompanying this description represents an improved plan which the inventor believes to be fully competent to meet the objections usual to the ordinary brake.



The doubletree over the front of the hounds is connected by a slotted plate through which a bolt passes in the usual manner, with a plate, also slotted, extending back to receive the king bolt that passes through the forward axle. The connection between the two is made by a pivot or by hinges. This latter plate is fixed to a cross bar and is connected by rods to a sway bar under the reach. To this bar are attached, by slings or stirrups, shoes or brakes, as seen in the engraving. The cross bar and sway bar are connected by rods and are kept back by two semi-circular springs fixed to the axle at their inner ends and to both these movable bars. A friction roller is pivoted to the under side of the reach just in advance of the sway bar, and impinges on a curved strap affixed to the sway bar so that it will be the means of taking up a portion of the strain of the draft and distributing it proportionately upon all the parts.

The bringing forward of the shoes or brakes is accomplished by means of the rods connecting the suspending stirrups and the axle, so that when the draft is released the springs throw the sway bar backward and the rounded heel of the shoe is brought in contact with the tires; the forward motion of the wheels in combination with this rounded portion inevitably bringing the faces of the shoes in contact with the periphery of the wheels. In backing, the shoes will be held away from the tires by the reverse motion, as is obvious. The length of the slots in the plates mentioned are arranged with reference to the position of the friction roller and curved plate that the draft strain must be equally distributed, instead of being sustained wholly by the king bolt or the bolt of the doubletree.

Patented through the Scientific American Patent Agency by F. D. Ladenberger, who may be addressed for additional information at Glenbeulah, Sheboygan Co., Wis.

Sea Sickness.

An abstract of a paper upon the above subject in *The Medical Gazette*, of the 7th November, contains rules for the guidance, of those who are about to undertake sea voyages. The hearty meal system before going aboard, conflicts, to say the least, with the views of those whose opinions, based upon much experience in voyaging, ought to be valuable. We give below the rules, and would ask of our numerous sea-going readers their views of the subject:

"Those liable to be sick should make a hearty meal not more than two or three hours before going on board. They should select a spot as near as possible to the center of the vessel, and lie down before she gets under weigh. The horizontal position should be rigidly kept during the whole passage. The person should be well covered, not only to protect from cold, but to shield from disagreeable sounds, sights, and smells. A stateroom should be selected as near as possible to the center of the ship, but not near the furnaces. In going to Europe, it is better to be on the starboard, and, in returning, on the larboard, which will be the sunny side. The following suggestions for the prevention of sea-sickness had proven efficacious:

"1st. Have every preparation made at least twenty-four hours before starting, so that the system may not be exhausted by overwork and want of sleep. This direction is particularly important for ladies.

"2d. Eat as hearty a meal as possible before going on board.

"3d. Go on board sufficiently early to arrange such things as may be wanted for the first day or two, so that they may be easy of access; then undress and go to bed before the vessel gets under weigh. The neglect of this rule by those who are liable to sea-sickness is sure to be regretted.

"4th. Eat regularly and heartily, but without raising the head, for at least one or two days. In this way the habit of digestion is kept up, the strength is preserved, while the system becomes accustomed to the constant change of equilibrium.

"5th, On the first night out, take some mild laxative pills, as for example, two or three of the compound rhubarb pills. Most persons have a tendency to become constipated at sea, although diarrhœa occurs in a certain per centage. Constipation not only results from sea-sickness, but in turn aggravates it. . . The effervescing laxatives, like the Seidlitz, or the solution of the citrate of magnesia, taken in the morning on an empty stomach, are bad in sea sickness.

"6th. After having become so far habituated to the sea as to be able to take your meals at the table and to go on deck, never think of rising until you have eaten something, as a plate of oatmeal porridge, or a cup of coffee or tea, with seabiscuit or toast.

"7th. If subsequently during the voyage the sea should become unusually rough, go to bed before getting sick. It is foolish to dare anything when there is no glory to be won, and *something* may be lost."

We know from experience that these directions are generally sound, but if "the horizontal position should be rigidly kept during the whole passage" we suggest that the patient be strapped down to an oak plank or an amputating table. This practice would insure a continued rigidity all the way over.

GREEK FIRE.—What is commonly called Greek fire, consists of a solution of phosphorus, or of sulphur and phosphorus, in a very volatile liquid, the bisulphide of carbon, to which some mineral oil is added, to increase its incendiary powers. To extinguish the flame produced by this agent, throw upon the burning surface some wet or damp sand, ashes, sawdust, lime, or wet sacking or carpeting, any material by which the flame can be stifled by exclusion of air. No attempt should be made to remove the covering for some time after the flame has been extinguished. A powerful jet of water should be played upon the place afterwards.

A QUEER case of combustion occurred at Elk Grove, Wisconsin. Mr. Shane Morgan was threshing wheat with a machine, when the wheat ignited from the machine, and stacks, machine and appliances, were all consumed.

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ICE MACHINES.

II.—MACHINES ACTING BY THE PREVIOUS APPLICATION OF HEAT.

To understand the working of this apparatus it is necessary previously to explain a few peculiar properties of ammoniacal gas, chemically simply called ammonia. A solution of this gas in water is universally known as spirits of hartshorn or liquid ammonia; the gas is produced by heating an intimate mixture of chloride of ammonium (sal ammoniac) with slaked lime; the chlorine combines with the lime, the ammonia is set free, and being a gaseous substance escapes; when this gas passes through cold water it is readily absorbed, as the affinity of water for ammonia is so very great that it will dissolve of this gas 1,000 times its own volume. It is absorbed with such rapidity that when a bottle, filled with ammoniacal gas, is with its neck plunged in cold water, the water will rush in the bottle as suddenly as if previously a vacuum had been made in it; this demonstration of the rapid solution of the gas by the water, constitutes a common but striking lecture-room experiment. On the contrary, when the water is hot it will not only absorb no gas, but by heating water previously charged with it, the gas absorbed at a low temperature will be almost entirely expelled.

Another property of this gas is, that it also may be liquefied without the intervention of water. When at the common temperature of 70° Fah., a pressure of nine atmospheres, or 135 pounds to the square inch is applied to it, it will take the liquid form, and by relieving the pressure, return at once to the gaseous state. The liquefied gas is thus not to be confounded with its solution in water, having quite different properties.

Now a principle comes into play here, which has been alluded to before, and which is also at the base of the working of different machines operated by ether, water and sulphuric acid, carbonic acid, chymogene or petroleum gas, etc.; namely, when a liquid substance, by removal of pressure, is forced to assume a gaseous condition, it will absorb heat; as a general rule it is necessary to communicate heat to liquids when we wish to change them into a gaseous condition, and the greater portion of the heat will become latent, which means that no thermometer will indicate it, it is, as it were, hidden in the gas or vapor; but when we force liquids to become gaseous without giving them the heat absolutely required to assume the gaseous condition, they will take the heat from he surrounding bodies, and from themselves, that is, from he liquid remaining, from the vessel containing it, and from the sensible heat of the escaping gas, which then, by the thermometer, will indicate a very low temperature, and communicate this to all bodies they come in contact with, or in other words, absorb their heat after the laws of caloric equilibrium. The more so, when in case of a liquid which owes its condition to pressure, by removal of this pressure, we allow the liquid to resume its natural gaseous condition, it will absorb still more heat than in the previous case, and consequently the degree of cold produced will be in exact proportion to the pressure previously required to keep it in the liquid state.

As a matter of course there are practical limits; where the immense power required to liquefy certain gases would not be compensated for by the greater degree of cold produced, and on the other hand, where the volatile power of the liquid employed is small and consequently affects only a slight degree of cooling, the results cannot be of the most favorable kind.

These are the properties of which use is made in the machine now to be described. It appears to have been first practically applied to the making of ice by Carré, of Paris, who, in 1862, had such a machine on exhibition in London; its construction is so simple that it may be easily understood without figures. It consists of two vertical cylindrical vessels, of different size, at their upper ends connected by a tube; they are made of strong sheet iron; the largest of them has double sides, the space between them being hermetically closed, and at its upper part connected by means of a strong tube, with the upper part of the second smaller vessel, which is a simple upright cylinder and also hermetically closed; the vessel is filled with a strong solution of ammonia in water, or the so called *aqua ammonia fortior*. By the heating of this vessel the ammoniacal gas is driven out of the water, according to the properties explained above, and if the double-sided vessel, at the same time, is placed in cold water, the pressure of the developed gas, will be sufficient to liquefy the gas itself between the double walls of the large vessel. As soon as this is accomplished, the apparatus is ready to commence the freezing operation, the water to be frozen is placed in a proper vessel of a thin well-conducting metal closely fitting in the open space inside the double-walled larger cylinder, between the walls of which the ammoniacal gas has now been liquefied by the pressure produced by heating the smaller vessel. This smaller vessel being hot, is now suddenly plunged in cold water, the water confined inside which first had its ammonia expelled by heat, regains at once by means of the cold applied to it, its most intense affinity for this gas, it will absorb it with great rapidity, the liquefied gas in the larger vessel will be relieved from the pressure which brought and kept it in the liquid state, and it will consequently re-adopt the gaseous form, distil over as it were, to be condensed in the water of the smaller vessel, and this forced evaporation in the larger vessel, will be productive of such an absorption of heat from this vessel and the water contained in its center, that this water will rapidly be frozen to a very hard solid cylinder of ice.

Experience has taught the following rules in the manipulation of his apparatus: The heating of the smaller vessel containing the solution of ammonia in water, must be done slowly, till a thermometer connected with it shows a temperature of 260° Fah. above the larger vessel placed in the cold water, which must be kept agitated, or, better, continually renewed by a small stream, in order to keep it cool, much heat being developed or set free during the liquefaction of the gas inside. It is this same heat which is absorbed by the evaporation of the liquefied gas during the consecutive absorption of this gas by the water in the smaller vessel, which produces the freezing temperature; this heat (abstracted from the water to be frozen), will be set free again, and is thus carried to the cooling water into which the smaller vessel is placed. The operation thus amounts to the abstraction of heat from a small portion of water (to be frozen) and the carrying of it to a larger portion of water, by means of the peculiar properties of ammonia, as explained.

It is clear that after this freezing the apparatus is at once ready for another operation, the only precaution being to turn the vessel for a few seconds in such a position that any water carried over accidentally into the double-walled vessel may run back into the smaller one, so as to be sure that the double-walled vessel is entirely empty, when commencing the operation: the heating of the smaller vessel containing the solution of ammonia in water.

THE BEST MODES OF TESTING THE POWER AND ECONOMY OF STEAM ENGINES.

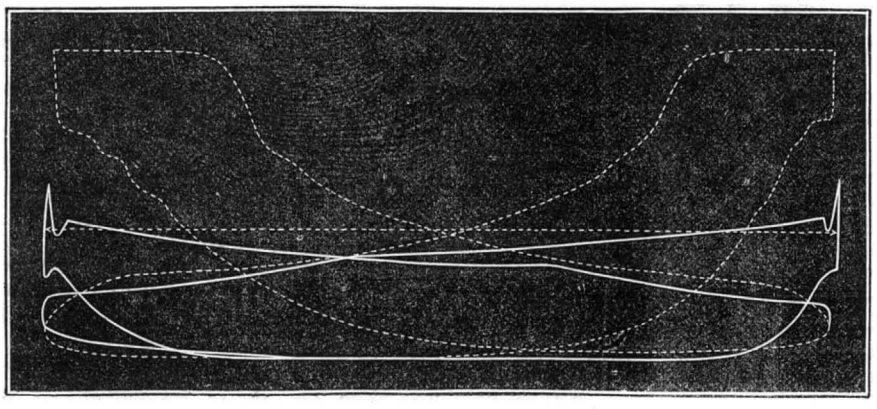
BY CHARLES E. EMERY, LATE OF THE U. S NAVY AND U. S. STEAM EXPANSION EXPERIMENTS.

Read before the Polytechnic branch of the American Institute, Oct. 22, 1868.

(*Continued from page* 323.)

NOTE.—Mr. Emery, when reading that portion of his paper which was published on page 322, exhibited the diagrams above shown in support of his position. "These," he said, "were selected from a number taken in the manner described, for the purpose of testing the accuracy of the indicator when used under different circumstances. The engine was provided with a link motion, which was adjusted first to give a certain speed with a wide throttle, and afterward shifted to full gear, and the throttle closed to give the same speed, without altering the load. The two sets of diagrams should therefore bear the same area. On the contrary, the difference can be seen with the eye. The light diagram shows a mean effective pressure of 8·6 lbs., while that of the dotted diagram is 11·06 lbs., or 28·6 per cent larger. The engine was making fifty-one revolutions per minute, and the scale of the indicator was 16 lbs. to the inch. (N. B.—The diagrams have been reduced to suit our columns.—EDS.) In this case the tardy action of the pencil of the instrument showed itself both on the steam and cushion lines, so the difference is enormous. With an independent exhaust valve, the difference in proportion would have been only about twelve per cent, and by using a stiffer spring would have been still up." Mr. Emery requested others to try the experiment themselves before expressing their views too strenuously, and then proceeded with the reading of his paper.

When the indicated power alone is used, it is important to know the probable friction of the engine, so that the net power, or that portion available for useful work, may be estimated. A favorite method is to take an indicator friction diagram from the engine, when disconnected from its load, and running at its working speed. The mean friction pressure thus obtained is supposed to be constant at all loads. Hence it is usual to deduct from the indicated working pressure the indicated friction pressure previously obtained, when the remainder represents the force available to produce motion. From this, however, is deducted the friction of the load, usually called seven and a half per cent; and the net power is calculated from the second remainder. For instance, if the mean working pressure be 42 lbs., and the friction pressure 2 lbs., 40 lbs. is available to produce motion without a load; and seven and one half per cent of this, or 3 lbs., represents the friction of the load; so that 5 lbs. pressure is lost in friction, or about twelve per cent of the whole. This mode of calculation cannot always be depended upon. We have known a case where the mean indicated working pressure in the cylinder was only 8 lbs., and the friction pressure two pounds. Consequently, by the above method, about thirty per cent of the power was absorbed by friction; but the dynamometer showed that less than ten per cent was lost in that way. Similar cases, differing only in extent, will be found quite frequent. The reason is that engines are packed for the working, and not for the friction pressure. If the steam pressure be 100 lbs., the packing must embrace the piston and valve rods with sufficient force to prevent leakage, or say 105 lbs. for every square inch of surface packed; and nearly the whole of this will produce friction, when a low pressure is used, but the full pressure will work in between the surfaces, and force back the packing, so that the friction from that source will be least when the engine is doing its regular duty. Spring packed pistons modify the friction in the same way. In very large engines the state of the packing would have little influence on the friction, though it certainly would seem proper to loosen the stuffing boxes before taking friction diagrams. In some cases engines are so weakly constructed, that, though the indicator may show little friction, without a load, there will really be a great loss when the work is being done, due to parts springing out of line, etc. The dynamometer furnishes, therefore, the only true means of obtaining the net power. In well constructed engines we should be able to calculate the friction by regarding the weight of the moving parts as part of the load, which is moving with a certain velocity in bearings of a given material, and having therefore a certain co-efficient of friction, say seven to eight per cent. For ordinary purposes, when trial is not convenient, we may assume the friction of small engines, of bad design, or of any engine with weak framing, as being from twenty to twenty-five per cent of the indicated power; while in good engines, of ordinary shape and proportions, it is sufficient to allow fifteen per cent for medium size, and as low as ten per cent, or even eight per cent, in exceptional cases, in large engines of solid construction and good workmanship.



Having described the instruments used in determining the power of the steam engine, we propose to postpone future remarks upon the proper methods of their application and use, until the closing general discussions; and we will now proceed with the next branch of inquiry; namely,

II. THE ECONOMY OR COST OF THE POWER.

Money is the standard unit of value. Hence everything which costs money, that is required in order to obtain the steam power in any case, is a proper charge to the cost of the power. Therefore, strictly speaking, the cost of the fuel, of the oil, and of needed repairs, together with the wages of the attendants, and also, perhaps, a sinking fund for prospective renewals, should all form part of the aggregate cost. Nor should either of these items be neglected. It would be poor economy for a person to purchase an engine designed to save fuel, which, for any reason, was liable to frequent derangement; for it is not alone the cost of the repairs which are to be considered, but the losses which occur from stopping work in the mill or factory. We cannot, however, in our present inquiry, discuss matters of design (though they should always be considered by a purchaser), but must confine ourselves to the methods and means employed to ascertain the economy of fuel.

The combustion of the fuel evolves heat, which uses water as a vehicle, and is carried with it to the engine, and there produces the power. The true measure of the cost, then, is the quantity of heat required to perform a certain quantity of work. Heat being imponderable, can be measured only by its effects on other bodies. The standard unit of heat, or "heat unit," is the heat required to raise the temperature of one pound of distilled water at 39° one degree Fahrenheit. The mechanical equivalent of a unit of heat is 772 foot pounds of work; but the best steam engines obtain only about one tenth of that quantity. Such a result has often been regretted by scientific minds, and many have spoken of it as mysterious. We consider the steam engine of to-day very defective. Some of the defects are inherent; they can be pointed out, but cannot be remedied without changing the general principles of construction. The majority of the practical loss has, however, never been satisfactorily explained. The writer, like others, has his own theories on the subject, but he has no desire to present them publicly till they have been tested; for if they be correct, the principal difficulties can be removed. Few appreciate the extent of the losses in the steam engine. It is only the best examples that utilize even one tenth of the heat. In such cases one tenth is condensed for the work, and about four tenths is wasted in the clearances and the exhausting steam, even when expansion is carried on, until the terminal equals the back pressure. The remaining five tenths are imperfectly accounted for. Cases are not unfrequent where only three to five per cent of the heat taken from the boiler is utilized in work! The discrepancies occur chiefly at the higher grades of expansion. Without expansion, it is easy to understand that most of the heat must go away with the exhaust.

When steam is generated by the application of heat in the boiler, to water only, the water, in becoming steam, always takes up a certain fixed quantity of heat; in other words, becomes saturated with it, and forms saturated steam. Hence, if we can measure the water evaporated, to produce the power of an engine, we can easily estimate the quantity of heat used. The feed water is therefore a perfect measure of the comparative cost of the power, when evaporated in a good boiler, having no superheating surface. The economy of steam machinery is, however, generally measured by the amount of coal or other fuel consumed to perform a certain quantity of work. The conventional standard of comparison between all kinds of engines is, The Number of Pounds of Coal Burned per Indicated Horse Power per Hour. The indicated power can be obtained with comparative ease, as has been explained; so also can the coal per hour. Hence the above standard has the merit of great simplicity, and consequently is used by all nations. We must therefore adopt it, or at least use it, in order to be able to compare our results with those of others; still the method is liable to very considerable errors, which we will examine with the view of correcting them.

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It has been shown that the indicator cannot always be relied upon to accurately measure the power. The qualities of coal vary so much, also, in different localities, that the amount consumed does not furnish an accurate comparative measure of the cost of the power. When the coal measure alone is used, too, the engines and boilers are both tested together, which gives no opportunity to ascertain which of the two is entitled to the credit of the performance. This standard will not then answer the purpose of a scientific investigation. In such case we must ascertain, in addition to the coal, the amount of water evaporated; we can then estimate the value of the coal, and the separate efficiency of both the engine and boiler. The value of the coal, and the efficiency of the boiler, are shown by The Number of Pounds of Water Evaporated per Pound of Coal, and the economy of the engine as compared with that of others by calculating The Number of Pounds of Steam Used per Horse Power per Hour. The weight of the steam used is, of course, the same as that of the water evaporated.

In all ordinary practical trials, the economy must be determined simply by the quantity of fuel consumed to produce the power. Hence we will first try and find a solution of the difficulties which attend this kind of measurement.

THE FUEL.

The different kinds of fuel vary so much in value that it is impossible to accurately compare them. Coal being most generally used, is the natural standard; but there are so many varieties of this necessary article, varying greatly in quality, that it seems a hopeless task to try and compare the performance of steam engines in different parts of the world, or even of our own country, by the consumption of differing coal, which may vary twenty per cent in heat producing power. The best way is, evidently, in comparative trials, to use selected coal from the same mine. Yet, how rarely can this be done? and even if this precaution be taken, in certain cases, how can a comparison be made with the results obtained by others widely separated, and possessing, possibly, different views? We must say that the problem cannot be solved with scientific accuracy; still we are able to suggest some corrections which will reduce all varieties of good coal to substantially the same standard, and thus enable us to use this measure in simple practical trials.

We cannot examine in this paper, with any minuteness, the chemical constituents of the different varieties of coal. For our purpose we will simply divide them into two portions; namely, the non-combustible and combustible.

The non-combustible portion consists, for the most part, of earthy matters, though oxygen and nitrogen gases are often present; and most coals absorb considerable water. The combustible portion consists of carbon and hydrogen, the first largely predominating. In American anthracite about three per cent of the combustible is hydrogen. The semi-anthracite combustible contains about five per cent; and the bituminous varieties a large proportion, varying with the locality of the mines. It is authoritatively stated, that, in some varieties of Ohio and West Pennsylvania coal, the hydrogen element is often twenty-four per cent of the whole combustible. For the consumption of equal weights of hydrogen and carbon, the first requires three times as much oxygen as the latter; the heat resulting should therefore bear a somewhat similar proportion. Favre, Sieberman, Andrews, and others, have, from experiment, estimated the calorific value of one pound of carbon to be the heating of about 14,000 pounds of water, one degree Fahrenheit. The corresponding value of hydrogen was similarly determined to be about 60,000 heat units. Bituminous coal, containing considerable hydrogen, should therefore produce a very much more heat in combustion than anthracite; but in practice the difference is comparatively small. Mere differences in mechanical structure appear to have a greater influence than chemical constitution. The reason is not evident. The latent heat of the steam resulting from the combustion of hydrogen, which is lost in the atmosphere, will not nearly account for the discrepancy. Without attempting an explanation, except perhaps imperfect combustion, we can, for our purpose, only turn to the records of practical experiments, and find what different kinds of coal have done, and may therefore be expected to do again.

Bourne gives the evaporation efficiency of thirty varieties of coal from different parts of the British Isles, or from 7 to 10·2 pounds of water from a temperature of 212°. The average was 8·7 lbs. These coals are, as is well known, of the soft or bituminous variety. The results of experiments made by the Navy Department, with thirteen varieties of American anthracite, from different parts of the Pennsylvania coal field, gave a mean evaporative efficiency per pound of coal of 8·9 pounds of water, from a temperature of 212° Fah. Three specimens of American bituminous coal gave a mean result of 9·9 pounds, under similar conditions. These figures make it appear that our American coals are superior to those of other nations. Professor Johnson, at an earlier period, made some experiments for our Government, with smaller quantities, but obtained more marked results in the same direction. On the contrary, the engineers of the English and French steamers, out of this port, speak of our Cumberland and kindred varieties of coal as inferior to those procured at home. We are in search of the truth, and cannot therefore cater to national vanity. Our best bituminous and clean, free-burning anthracite coals are undoubtedly better than can be found in large quantities in any other part of the globe. All must admit, however, that some of our American bituminous coals are almost identical with the English in appearance and chemical constitution. Both should therefore give the same results, when tested under the same circumstances. In the experiments above mentioned, the English coals comprised a greater number of kinds, the bad being averaged with the good. The United States Government experiments were tried with the greatest care, and in a boiler better proportioned for economy, probably, than the average in England. On the whole, we think it fair to assume that the English and American bituminous coals, of the qualities ordinarily supplied to the market, are substantially equal in value, though selected varieties, fresh from our mines, would of course give much better results.

The Government experiments above mentioned showed that the evaporative efficiency of the American anthracite, and the American bituminous coals are in the proportion of 8·9 to 9·9.

(To be continued.)

The California Earthquakes—A different System of Building Necessary.

W. Frank Stewart, Esq., published a series of articles in the *San Francisco Alta.*, in 1865, called forth by the earthquake of October of that year, an extract from which will be read with interest at the present time:

"When the solid land trembles and gyrates beneath us, like a disabled ship upon the waves; when the substantial habitations of men come toppling headlong to the ground, and when the startled populace, with blanched lips and whitened visages and smiting knees, rush shrieking and howling into the streets, the appalling phenomenon may be a matter of levity to the learned, but for my part, I have yet to discover 'where the laugh comes in.'

"In this region, together with the visible evidences that, at no very remote period, the country has experienced far more powerful shakings, are warnings which sensible people cannot disregard. There are old settlers still surviving in California who have witnessed convulsions of the earth which would have demolished the most substantial building in San Francisco. Only a few years ago an earthquake occurred which opened a chasm in Salinas Plains, which is yet plainly traceable for a distance of fifty miles. During the shock of the 8th of last month (Oct., 1865), the ground to the north of San Juan was rent into innumerable fissures all along the stage route. Will any sane man contend that if these cracks and chasms had occurred in a similar manner on Montgomery street, the lofty brick shells along that thoroughfare would have remained uninjured? It is utterly beyond the limit of possiblility that a perpendicular brick wall, sixty feet in height and only one foot in thickness, could stand up under such circumstances.

"I know it is dangerous to make predictions, but, guided by the experience of the past and by the deductions of science, I shall hazard the opinion that every brick and stone building now on the coast of California will be thrown down by an earthquake, unless mechanical skill can render them more secure than they now are. Men may smile at my suggestion of 'pyramidal walls,' but the day is not far distant when our present shell walls will not be considered particularly safe."

Mr. Stewart, who is said to have devised a means for determining the time when earthquakes may be expected to return, and who has given so much attention to the subject that he has acquired the title of the *Earthquake Seer of San José*, according to the *Argus*, of that city, made a prediction that an earthquake would be felt of greater force than had ever been witnessed since the settlement of the coast by Americans. His confidence was so great in the truth of his prediction that he backed it with a bet, and of course has won.

Editorial Summary.

EPXPLOSION OF A SOAP TANK.—A saponifying tank in a soap and candle factory in Cincinnati exploded on Nov. 4th. Two workmen in the factory were badly scalded by the hot stearine, but a number of others, men and women, employed escaped uninjured. The tank, twelve feet long and six feet in diameter, was projected upward some five hundred feet and alighted a distance of two and a half squares from the point of explosion. The tank had for years borne a pressure of from eighty-five to ninety pounds per square inch, receiving its steam direct from the boiler, the steam being used to separate the glycerin from the tallow.

THE *World* intimates, not without reason, that members of Congress are selling their frank to further private enterprises and personal schemes. We have repeatedly called attention to the abuse of this privilege, and we have now before us a letter from a western correspondent in which he asserts that he received fifty copies of a pamplet of a swindling patent agency at Washington under the frank of John A. Logan, M. C., (Pub. Doc). We prefer to think that Mr. Logan knows nothing about the business, but be that as it may, it is a fraud upon the postal revenues.

ACCORDING to the returns made to the United States Assessors, the total value of the boots and shoes manufactured and sold in Lynn, during the three months ending Oct. 1, was $3,483,477. This does not include goods made by the smaller manufacturers, whose sales do not amount to $5,000 annually, which amount, added to the above, would give a total of at least three and a half million dollars for the past three months. For the corresponding period last year the sales amounted to $3,214,060.

WE see it stated that Liebig, the chemist, complains that people are forever pestering him with letters asking questions of the most extraordinarily silly nature, such as they might naswer for themselves by consulting any elementary text-books. They come at the rate of two or three hundred a day and in eight or ten different languages.

A PARTIAL obscuration of the sun has recently been made the subject of observation and comment in Calfornia. Many attributed this to a smoky condition of the air caused by distant fires in the woods. The California Academy of Sciences have taken the subject into consideration and have decided that the extreme heat and dryness had caused the moisture from the fog to disappear, and left the silicious and saline matters contained in it suspended in the air.

MANUFACTURE OF SUGAR.—A German paper mentiones a new process of refining sugar in which the saccharine juice, after being clarified in the usual way by means of lime and carbonic acid, is precipitated at boiling temperature with caustic baryta (60 parts of the latter for every 100 of sugar), the precipitate suspended in water and decomposed with carbonic acid. A pure solution of sugar is obtained, which only requires to be evaporated.

IT is announced that an important discovery of iron ore of a superior quality for the manufacture of steel has been made near Ellenburg, Clinton Co., N. Y. The situation of the vein is said to be very favorable, being in the immediate vicinity of everything necessary to its profitable working. By all accounts the quality and quantity of ore in the new mine bid fair to rival if not excel those of the Peru mine in the same county.

ALONG the lines of the principal railways in England the self-delivery mail bag arrangement is now in use for express trains. The Crane Hook delivery is soon to be put in motion at the several way stations between Boston and Springfield. The mail bag is suspended on a hook at the station, and is taken off by a hook fixed at the same hight on the mail car.

A POWERFUL LENS.—Mr. Parker of London, has just made a lens, three feet in diameter, three inches thick in the center, and weighing two hundred and twelve pounds. In the focus of this powerful lens the most refractory metals are almost instantly fused and dissipated in vapor, while unyielding stony substances are as readily vitrified.

OLE BULL, after charming for years the musical world by his skillful performances upon the violin, has at last, it is said, turned inventor. He has invented an improvement in sounding boards for pianos, by which the sound can be prolonged. This has been a long sought desideratum.

TEH *Rural New Yorker*, advertised in this number is one of the very best agricultural and family journals in this country. It is to be enlarged to sixteen double quarto pages, and otherwise improved.

CHASSEPOT has commenced a suit against the French Minister of war for $200,000 due him on a rifle contract. His rifles are pronounced worthless, hence payment has been refused.

THE fossil remains of an immense crocodile have been found at the end of the Kansas Pacific Railroad. The entire length of the skeleton is 125 feet.

THE heart softened by the fire of affliction is like the iron when heated in the furnace; capable of receiving impressions and being fashoned at will.

LEATHER belts are frequently ruined by too much oil. It permeates and rots the leather, or burns it by the heat generated by friction.

MRS. SECRETARY McCULLOCH'S REPORT.

No Decline in Household Treasures.

Ten years ago I purchased a Wheeler & Wilson Sewing Machine, and have had it in constant use in my family since. We used it during the war to make clothing for our volunteers in the service, and for the hospitals, and this work was very heavy, being coarse woolen and cotton fabrics. It is still in good working order, nothing having been broken but a few needles.

You are welcome to use my name in your recommendations.

MRS. HUGH McCULLOCH,
Wife of Secretary of U. S. Treasury, Washington.

To Messrs. Wheeler & Wilson.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

BEAVER DAMS.—One of the agents in the construction department of the Union Pacific Railroad says, that in floating ties down the Laramie river, it becomes necessary to build dams to produce a flood in consequence of the low stage of the water, as is frequently done in the Oil Regions of Pennsylvania, to float the flat boats loaded with oil, and which saved our fleet on the Red River during the late war. After the men left their work at night beavers begun where they left off and carried it on in a very satisfactory manner. In two or three instances where breaks occurred, these industrious animals have repaired them in a single night, to the saving of hundreds of dollars to the contractor.

An armor has been made at Brown's Atlas Works, Sheffield, England which was, before rolling, 20 feet long, 4 feet broad, and 21 inches thick weighing 420 cwt. The final rolling reduced the thickness to 15 inches. Two hundred and fifty tuns of coal were consumed, and the labor of 200 men required for its production.

Chicago is to have some new gas works to cost $400,000 and consume 45,000 tuns of coal per annum. The gas holder's capacity is 600,000.

The Boston and Maine Eastern Railroads have made arrangements with the Montreal Ocean Steamship Company, to transport merchandise brought from Europe in the steamers of that line, and landed at Portland, to Boston and any part of New England.

A vessel arrived at Cleveland, Ohio, last week bringing with her 821 tuns of iron ore from Marquette, Mich., the largest cargo of iron ever yet received at that port.

A new line of steamers is to be established between Italy and New York. The vessels will run from Naples to New York, and *vice versa*, touching at Messina and Palermo.

The latest attempt to establish communication between passengers and guard, and guard and driver on English railroads, appears, from the *Engineer*, to be a series of tubes for whistling, speaking, and displaying signals. Its value is yet an unsolved problem.

The Bessemer Steel Works, at Troy, N. Y., burned on the 20th of October, are to be immediately rebuilt. The original cost of the mill was $250,000 and

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lars, but the loss sustained from the fire will not exceed $75,000. The engine and engine house are uninjured. Two of the converters are also uninjured.

The gold product of Nova Scotia for the last eight year amounts to nearly $3,000,000.

Improvements amounting to $1,200,000 are being made upon the Chicago docks.

The Scotch iron works produced in 1867 over a million of tuns of pig iron.

English capitalists have $90,000,000 invested in East India Railways.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

HAY AND COTTON PRESS.—Stephen Q. Carey, Waxahatchie, Texas.—The object of this invention is to provide a press which shall be simple and neat in construction and appearance, which can be conveniently and rapidly worked, and the operation of which shall be such that the platen in starting moves quickly, but as it approaches the end of its movement its velocity decreases and its power proportionately increases.

HYDRANT.—Robert Reilly, Baltimore, Md.—This invention is a durable but simply and easily operated hydrant, which can be detached and removed from the water pipe by means of its own handle, and without the use of a wrench. It is constructed in a peculiar manner for convenience in taking it apart for repairs; and it is provided with an apparatus by which it indicates any leak within, and at the same time protects the working parts from dust and dirt.

APPARATUS FOR MANUFACTURING MEDICAL EXTRACTS.—Edward E. Burrough, Baltimore, Md.—This invention has for its object the construction of a simple, cheap, and convenient apparatus, with which, by the application of hot water to the walls and bottom of the vessel that contains the materials to be heated, essences, medical extracts, etc., may be rapidly, conveniently, and thoroughly extracted from either liquid or solid substances.

ANIMAL TRAP.—W. A. Stack, Hillsborough, Md.—This invention relates to the class of self-setting traps, and consists in a new and improved arrangement of the bait box with the trap door and passage way for the animals, by which they can be enticed more readily to the middle of the trap door, before it falls and precipitates them into the receptacle below.

FEED CUTTER.—Norman McLeod, Clio, S. C.—This invention contains several important improvements in feed cutters, among which may be mentioned the following, viz.: first, the knives can be sharpened on the machine; secondly, it does not waste the straw or grain; thirdly, it can be operated equally well by hand or horse power, in doors or out; fourthly, it is simple, light, portable, and cheap; fifthly, the sheaf box or feed table can be easily removed for convenience in transporting the instrument and in carrying it through small doors.

DERRICK FOR STACKING HAY.—J. B. Drake and W. H. Hutson, Montoursville, Pa.—The object of this invention is to provide a light, cheap, and convenient portable derrick for elevating and stacking hay, which when used in combination with a horse hay fork or other equivalent device, will raise the hay from the load, convey it to the proper position, and drop it upon the stack, and will then automatically return the hay fork to the load to receive another burden.

TOOL HOLDER FOR LATHES.—Wm. O. Hickok and Geo. W. Reisinger, Harrisburg, Pa.—This invention consists in a novel construction of the holder, whereby the tools may be fitted or applied to the holder with far greater facility than usual, and adjusted in proper position to suit the work required of them, with any trouble or difficulty whatever.

SLED BRAKE.—Jacob Latta and Lewis Snyder, Bethlehem Center, N. Y.—This invention consists in constructing a sled brake in such a manner that it may be rendered operative and inoperative when desired, and when applied or rendered operative admit of the sled being readily turned without subjecting the draft pole or thills to any undue strain.

SUSPENDER FASTENING.—Wendell Wright, Bloomfield, N. J.—This invention relates to a new and improved suspender fastening, and is designed to supersede the ordinary flexible straps provided with button holes to fit over buttons on the pantaloons and retain the latter in a proper elevated state ont the wearer.

KITCHEN UTENSIL.—Warren Cook, Arsenal, Pa.—This invention consists in so constructing a rolling pin as to render it available in several differen culinary operations.

METALLIC BRIDGE.—James B. Eads, St. Louis, Mo.—This invention relates to a new and useful improvement in the construction of metallic arch bridges, whereby a strong and substantial bridge is obtained with a comparatively light weight of metal.

PISTON FOR DEEP WELL PUMPS.—Charles Jarecki, Erie, Pa.—This invention relates more particularly to oil wells, which are usually sunk deep and which require the piston and working parts of the pumps to be of the most permanent and durable character.

LUBRICATOR.—Timothy Holland, New York city.—This invention relates to useful improvements in vessels for lubricating journals with oil or other lubricating liquid, whereby the ordinary glass lubricator is rendered more efficient than it has hitherto been.

POCKET TOBACCO CUTTER.—Edward L. Gilman and Theophilus S. Smith, Somerville, Mass.—The object of this invention is to provide a convenient pocket machine for the use of tobacco smokers, whereby they may cut their tobacco without resorting to their pocket knives for that purpose, and in combination a match box.

BAG FASTENER.—Charles H. Nye, Vineland, N. J.—This invention relates to an improvement in the method of fastening the mouths of bags for holding grain, or other products or articles, and it consists in securing to the bags, by a rivet and washer, leather straps containing a buckle of any suitable size and form, whereby the strap is buckled around the bag and the contents secured.

TOY WATCH.—Joseph Laubereau, Paris, France.—This invention relates to a motor obtained by the tension of an elastic string, with variable self-acting brake proportionate to the work that the motor is able to yield. This variable self-acting brake motion is applicable to various uses, where little force is required; viz., to regulators, toys, and more especially toy watches.

CAR COUPLING.—D. D. Howe, Beaver Dam, Wis.—This invention consists in constructing the buffer of two parts, one of which, provided with three walls of the opening for the hook, is rigidly secured to the framing of the car; the other, constituting the top half of the said opening, is connected to a yoke which is supported upon the end of a lever, whereby it may be raised when desired; it may also be raised by the hooks when the cars come together for coupling. It is arranged to be held in a downward or closed position by a spring. The said stationary part is provided with a round bolt against which the hook draws, which bolt is arranged so as to be readily removed for the substitution of another when worn, and a sliding rod is connected to the said lever, which serves as a plunger for throwing off the hook for uncoupling the cars.

STAYS FOR PAPER AND LINEN COLLARS.—Simon Kaufman, Fairbury, Ill.—This invention relates to improvement in the method of staying and supporting paper and linen collars whereby their durability is greatly increased.

POTATO AND CORN PLOW.—Charles F. Noftz, Toledo, Ohio.—The object of this invention is to construct a plow for cultivating corn, potatoes, rice, and other plants, which plow shall be of simple construction, cheap, durable, and adjustable to the width of furrows, and hight of rows.

HYDRANT.—James Allison, Cincinnati, Ohio.—The nature of my invention relates to improvements in hydrants, whereby it is designed to simplify and improve the construction of the same, and adapt them for use either as hydrants or fire plugs, and to provide them with detachable caps, whereby when it is designed to use them also for hitching posts, a cap or head indicative of such use may be readily attached to the post or projecting part above the ground.

MACHINE FOR PACKING TEA, COFFEE, ETC.—John Garsed, and Clayton Dunn, Frankford, Pa.—This invention relates to a new and improved machine for packing tea, coffee, etc., in paper bags, with a given weight of the article in each bag. The object of the invention is to obtain a means for the purpose specified, which will admit of the work being performed rapidly and in a perfect manner, and without the employment of skilled labor.

MILK CAN.—T. W. Akin, Patterson, N. Y.—This invention relates to a new milk can, which is made of iron, and provided with an iron bottom that rests upon a hoop riveted to the under side of the lower part of the can.

RAILROAD CHAIR AND SUPPORT.—Aaron Van Guysling, West Albany, N.Y.—This invention has for its object to improve the construction of railroad chairs and their supports, so as to furnish a substantial, reliable, and elastic support for the rails, which will hold said rails securely in place, and at the same time prevent the jar now so universally felt in railroad riding.

SELF-ADJUSTING HOOK.—William Bisbee, and Fleming G. Hearn, Yreka, Cal.—This invention has for object to improve the construction of the improved hook patented by the same inventors December 31, 1867, and numbered 72,784, so as to make it more convenient and effective in operation.

COMBINED LIFTING JACK AND CANT HOOK.—Daniel Fasig, Rowsburg, O.—This invention has for its object to furnish a simple and convenient machine for raising wagons, and for raising and turning, or canting timber, and which shall be so constructed and arranged that it may be easily adjusted to wagons of any hight, or timber of any size.

PROCESS FOR CASTING CAR WHEELS.—Henry M. Woodward, St. Louis, Mo.—This invention relates to improvements in the process of preparing cast iron, whether in the condition of pig or scrap, for making or casting car wheels, the object of which is to provide car wheels of a better and more uniform quality than can be produced by the common mode.

DRIVE WELL.—John S. Armstrong, Delaware, Ohio.—The object of this invention is to furnish an improved drive well. It consists of a conical point, having helical feathers or threads, which are cast on the point when the latter is made. The point is hollow a portion of its length, and the bore or cavity fits with easy contact on the end of the lower joint of the ordinary drive well tube, which is of the size of common gas pipe. The lower end of tube is formed with numerous perforations, which are closed against the entrance of sand, while the point is being forced down into the ground. When, however, it is desired to ascertain if there be water present, at any part of the descent, the tube is raised a few inches to raise several of the holes from out the barrel of the point, and water entering and rising to the surface of the ground will announce its presence.

VENTILATING APPARATUS.—Wilhelm Scharrath, Bielefeld, Prussia.—This invention relates to a new ventilating apparatus to be applied to all temporary or constant habitations of men or animanls, and consists in the arrangement of porous walls and ceilings or either to the rooms of houses or cars, or to the cabins of ships, so that fresh air, either in a heated or cooled state, may freely enter the said room or cabin, while the foul air can as freely escape.

MACHINE FOR CUTTING SLATE.—Thomas R. Drummond, Hartford, Conn.—This invention relates to a new and improved method of cutting slates for roofing and other purposes, and consists in forming a box knife corresponding in size to the superficial area of the slate, and in a weighted cushion connected therewith, and also in a cushioned spring bed surrounded by a metallic shell

TICKET AND TAG HOLDER.—James Bramble and Albert H. Nirdlinger.—Fort Wayne, Ind,—The object of this invention is to provide a convenient method for holding railroad and other tickets or fastening tags to goods or packages whereby the same may be exposed to view and still be securely fastened to the dress or package.

MACHINE FOR DRESSING HOP POLES.—C. D. Brown, Bainbridge, N. Y.—The object of this invention is to provide a simple and effective means for sharpening and dressing hop poles. It also consists in the arrangement of three cutter wheels on a shaft in such a manner that the poles to be sharpened or dressed may be passed between the said wheels, and be cut by cutters or knives affixed on the radial arms of the wheels, which latter are formed with reference to bearing the said knives and presenting their cutting edges to the wood in the most effective manner

IRON FENCE POST.—Wm. Merrell, Kent, Ohio.—The object of this invention is to furnish a fence post which is simple, durable, cheap, and efficient. It also consists of a flat, metallic fence post, usually of iron, and provided with groups of studs for receiving and holding the planks or horizontal parts of the fence.

PUNCHES.—Geo. C. Wilder, Lawrence, Kansas.—This invention relates to a new and improved method of constructing punches for the punching of nuts and washers whereby the washers or nuts are more rapidly and economically made. It also consists of a follower forced upwards against the washer or nut after the same has been formed by the force of a spring whereby the washer or nut is freed from the punch. It consists also of a central stationary punch over which the movable outer punch works wherepy a center hole is punched in the nut or washer at the same time that the washer or nut is punched out of the bar.

PUMP.—J. A. Shanner, Plainview, Ill.—This invention consists in a lift pump rod provided with a forked lower termination, wherein a two-lever valve is hinged, the said lever being partly composed of leather and partly of metal, and actuated by springs to open the same for lifting. It also consists in a peculiar arrangement of a toothed rack upon the pump rod and a pair of gear wheels for operating it.

NUT CRACKERS.—Charles Hayden, Collinsville, Conn.—This invention consists in providing one of the pins with a clamp, whereby it may be firmly clamped to a table in a stationary position and in providing two different points of application between the jaws, one for small and one for large nuts.

BRONZE DRESSING FOR LEATHER.—M. S. Cahill, Boston, Mass.—The object of this invention is to provide a fluid which will give a reasonably permanent bronze color to leather, and is more particularly designed as an accessory article in the boot and shoe trade, inasmuch as it will enable dealers to renovate their bronze shoes and boots when the same have become shop worn and tarnished, as in the case when this class of goods have been kept on hand for considerable time or much handled.

OPERATING THE SAILS OF VESSELS.—Frederick B. Dunton, Center Lincolnville, Me.—The object of this invention is to provide a sail, or sails, of a square rigged vessel, so-called, with devices by means of which the said sail or sails may be set, reefed, or furled in a quick and thorough manner from the deck; thereby lessening the labor of handling the sails, and dispensing with a portion of the attendants requisite for handling sails as ordinarily made and rigged.

MACHINE FOR BUNDLING WOOL.—H. F. Laroy, Richmond, Ill.—This invention consists of a table, the top of which is made in sections, the central and corner sections being secured to the table, while the four sections between the corners are hinged to the central sections and connected by levers and a belt to a foot lever, so arranged that, by the application of pressure to the foot levers, the said movable sections will be folded up like a bag, enclosing and compressing the wool or other article which is placed on the table in a compact bundle that may be tied by cords previously laid across the said movable sections.

SPINNING FRAMES.—J. L. Johnson and J. W. Foust, Evansburgh, Pa.—This invention consists in an arrangement of apparatus for moving the spindle carriage and a means of preserving the proper tension on the belt.

MOP WRINGER.—Geo. Wells and S. A. Haynes, Island Pond, Vt.—The object of this invention is to provide a simple and convenient apparatus for wringing mops. It consists of a pail having a bail or handle which acts as a lever to bring together or separate the squeezing rollers when the handle is lowered or raised.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

E. W., of Ohio.—A full description of the two wheeled velocipede with engravings is to be found on page 120, No. 8, of the current volume of the SCIENTIFIC AMERICAN.

G. A. D., of N. Y.—We see no objection to your using spectacles whose glasses are ground to different foci, in order to adapt them to the different conditions of sight in each eye.

J. P. J., of Ohio.—We can give you a recipe for making boots water proof, as, for instance: Beef tallow, 4 oz; rosin, 1 oz; beeswax, 1 oz; melted together. Add, when cold a quantity of neats-foot oil equal to the mass. Apply with a rag, warming the boots before a fire, to the soles as well as uppers, and rub in well with the hand. Two applications will make the boots thoroughly water proof and still keep them soft. We, however, do not approve of such preparations, as the feet generally perspire more than any other portions of the body, and any water proof preparations applied to boots prevent the perspiration from escaping and keep the feet wet and cold.

P. S., of Mass.—Good glue is the best cement for splicing new belts; the best belt makers use it in preference to any other preparations. All cemented joints in belts should be strengthened by a row of rivets on each cross edge. Better buy your belts of some manufacturer than attempt to make them yourself. It is cheaper. Measure the length of your belt by a string or twine and order accordingly. We have before published the plan of laying out belt holes through floors. We can give you the method by mail, if desired.

J. H. T., of Ill.—"What pressure must the feed pipe to a 14-H. P. boiler be able to stand without bursting, the water being forced with a two-inch pump, through a one-inch pipe, the pressure of steam never to be raised higher than 60 lbs.?" It should stand the pressure of 60 lbs. Can it have any greater pressure put upon it than the resistant of that in the boiler? It makes no difference what the capacity of your boiler, and you will find your one-inch pipe able to stand all the pressure per square inch your 14-H. P. boiler will.

E. W. K., of Mass.—On the subject of the use of divining rods, for ascertaining the true source of water supply, we have already published all that we desire to say on the subject. We have very little faith in the theory or practice. We regard it as an amusement rather than a settled science.

Business and Personal.

The charge for insertion under this head is one dollar a line. If the Notices exceed four lines, an extra charge will be made.

Send 10 cents to T. E. Zell, the publisher, Philadelphia, Pa., for a specimen No. of Zell's new popular Encyclopedia.

Dr. Carpenter's patent oxygenized electro-medicated inhalation cures consumption, bronchitis, catarrh, rheumatism, paralysis, etc. Territory for sale. Physicians are purchasing everywhere. Send for pamphlet to Dr. Carpenter, Newark, N. J.

For sale—the most perfect invention of a feathering paddle wheel extant. Address Richard Connelly, rear 2054 Lombard st., Phila., Pa.

Peck's patent drop press. Milo Peck & Co., New Haven, Ct.

Inventors, owners, and manufacturers of small patented articles send circulars and prices to J. C. Blair, box 87, Huntingdon, Pa.

The Lillingston paint, noticed in last week's Scientific American, can be had at 528 Water st., New York. Address Lillingston Paint Co.

For sale—Newhart & Co. plow factory, Terre Haute, Ind.

Keep posted on what manufacturers all over the United States are doing. See Boston Bulletin, the only paper that gives full reports of their business. Address Commercial Bulletin, Boston, Mass. Terms $4 per annum.

Wanted—A heavy shears, for cutting railroad iron. Address Napanoch Ax and Iron Co., Napanock, N. Y.

Wanted—a man with plenty of capital to bring out a new velocipede. Address J. R. A., Box 481, Providence. R. I.

For fine double or single-dressed American hemp shorts, bar fine tow, tow for paper makers, address W. W. Bruce, Legington, Ky.

Wants to sell rights to manufacture the simplest and best cider mill made. Address H. Sells, Vienna, Ontario.

American Watchmaker and Jeweler. By J. Parish Stelle. Jesse Haney & Co., 119 Nassau st., New York. Price 25 cents.

C. J. Fay's patent water-proof roofing, Camden, N. J.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for Lithograph, etc.

Portable pumping machinery to rent, of any capacity desired, and pass sand and gravel without injury. Wm. D. Andrews & Brother 414 Water st., New York.

N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct.

The paper that meets the eye of all the leading manufacturers throughout the United States—The Boston Bulletin.

Inventions Patented in England by Americans.

[Compiled from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,874.—WASHING APPARATUS.—C. H. Hudson, New York city. Sept. 18, 1868.

2,923.—PAINT OR COMPOSITION FOR PROTECTING SHIPS' BOTTOMS, PRESERVING SUBMARINE WOOD WORK, ETC.—Wm. F. Babcock, San Francisco, Cal. Sept. 23, 1868.

2,968.—CONVERTING CAST IRON INTO WROUGHT IRON, AND UNITING OXIDES AND FLUXES WITH MOLTEN CAST IRON.—Thos. S. Blair, Pittsburg, Pa Sept. 28, 1868.

2,980.—GAS BURNER.—Wilbur F. Parker, Meriden, Conn. Sept. 29, 1868.

2,996.—TREATING METALS FOR THE PURPOSE OF SEPARATING FROM IMPURITIES.—Norman Cutter, Cincinnati, Ohio. Sept. 30, 1868.

2,998.—MANUFACTURE OF WHITE LEAD, AND THE PRODUCTION OF CARBONIC ACID GAS FROM SAID MANUFACTURE, ETC.—Henry Hannen, B. F. Pine, and Thos. Woods, Philadelphia, Pa. Sept. 30, 1868.

3,000.—IMPROVEMENTS IN SEWING MACHINES, APPLICABLE TO OTHER MACHINES WORKED BY FOOT POWER.—Greenleaf Stackpole, New York city. Sept, 30, 1868.

CHANDELIER.—Hiram Tucker, Newton, Mass. Oct. 5, 1868.

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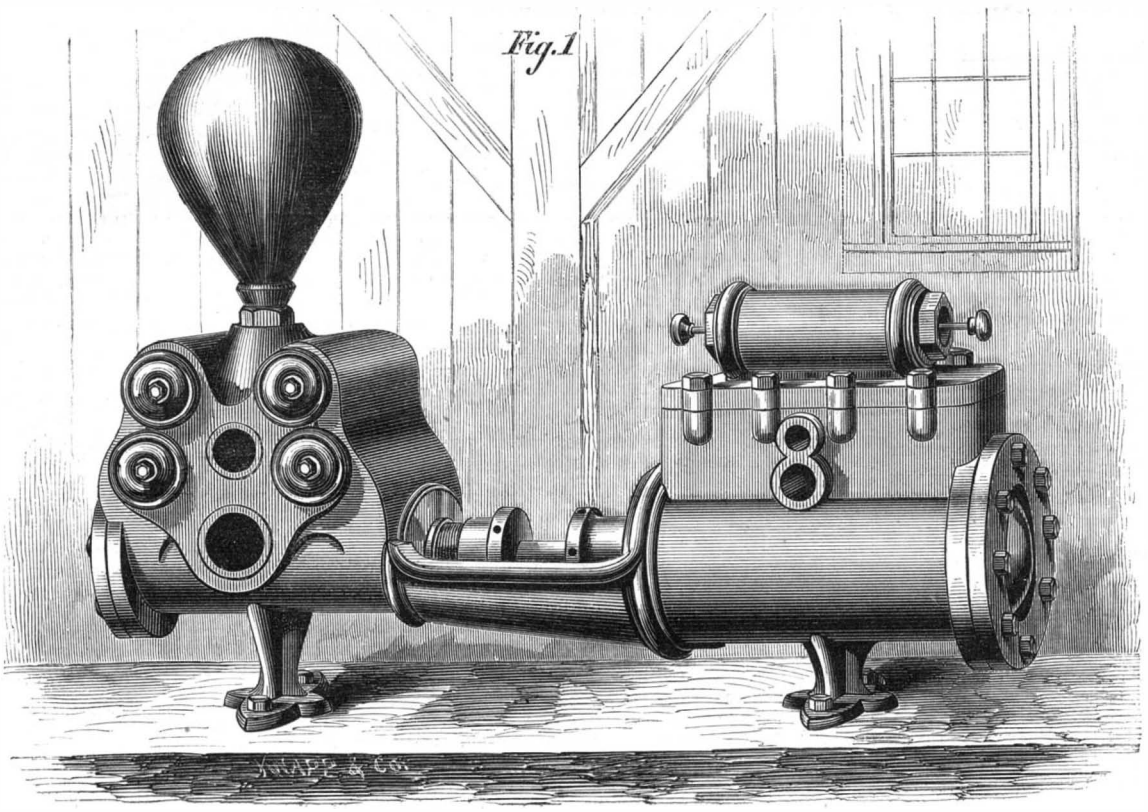
Improvement in Steam Pumps.

The unequal action of most of the steam pumps now employed, their liability to get out of order, and the excessive wear of the working parts, constitute objections to their general adoption, and offer opportunities for improvement. Such improvement has been attempted in the construction of the pump herewith illustrated, which is operated by steam alone, without the aid of tappet arms, eccentrics, or any of the complicated contrivances heretofore considered essential.

Fig. 1 is a perspective view, and Fig. 2, a vertical section, with letters of reference showing its internal construction, passages, valves, etc. In construction, the machine consists of an ordinary cylinder, A, and piston, B, the latter operated by steam admitted at either end by means of a cylindrical piston valve, C, which is moved by means of steam let on by the secondary valves, D, they being operated by the main piston, B, so that when the piston arrives near the end of its stroke, it lifts one of these valves and allows steam to pass into the valve chest through small passages connecting the live steam with the ends of the main valve, thus moving it and reversing the motion of the piston. This arrangement of the valves is peculiarly advantageous from the fact that these small valves being very nearly balanced by the pressure above and below, (just sufficient difference being made between the diameter of the stem and the diameter of the valve to make the pressure on the top of the valve slightly greater than below so as to keep the valve on its seat), they are easily lifted from their seats by the movement of the piston, and, being started, the current of steam immediately carries the valve up so that there is no wear between the hardened surface of the piston and the end of the valve stem. The manufacturers say:



SUTHERLAND'S PATENT STEAM PUMP.

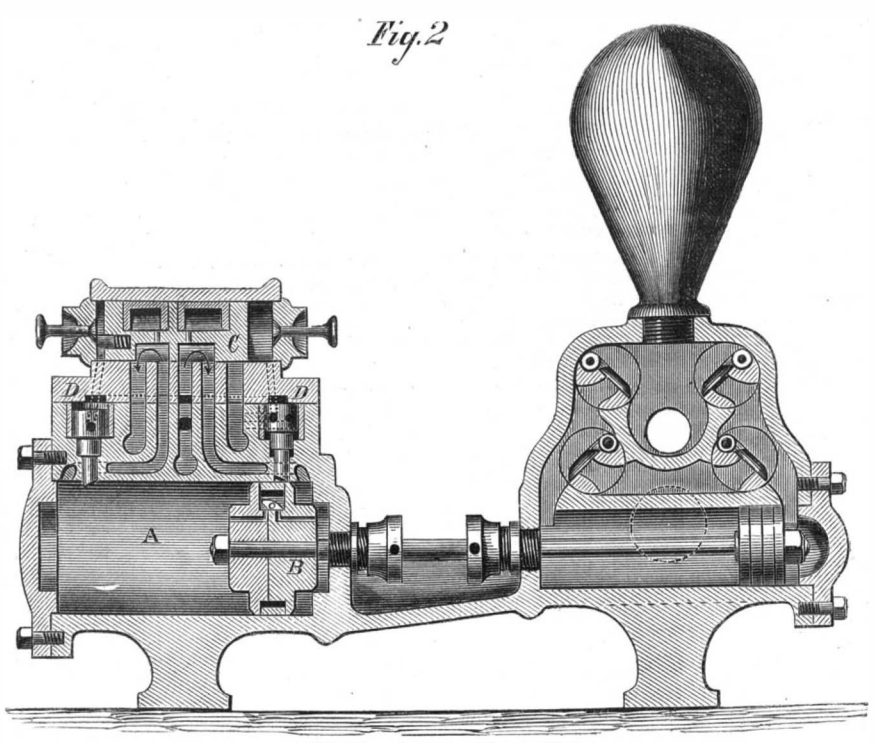
By the peculiar structure of these valves, we are enabled at the same instant, and by the same action, to admit live steam upon one end of the cylindrical valve, and to exhaust from the other end, thus insuring positive, true, and certain motion.

The pump is double-acting, and has two hinge valves communicating with the suction pipe, and two similar valves communicating with the delivery pipe. These valves are hung singly or in pairs, or all together, in a plug or cylinder, which is inserted in an opening made for the purpose, and fastened there. The object being, in such arrangements, to place the valves in such a manner that they may be readily removed and examined.

When these valves are hung in pairs, the arrangement of the lower plug consists merely of a single cavity communicating with the suction pipe, and having an opening on each side which the valves alternately open and close, allowing the water to flow into either end of the cylinder as the piston is moved, and preventing it from being forced out from the other end in the manner of ordinary valves in similar situations.

The upper plug is formed into three compartments by a longitudinal and lateral partition, so that the water may not, when forced, flow through the opposite valve back into the cylinder, but may have a free passage out into the delivery pipe, or up into the air chamber.

By dispensing with so much complicated mechanism, and thus relieving the pump of all unnecessary friction, it has great power, steadiness of motion, and velocity. Perfect surety of operation—it always starts readily. No dead points. Of great durability. Very compact, and from twenty to fifty per cent heavier than other steam pumps. Requires no skill to operate it. Small number of parts. Will pump water of all temperatures, even to boiling; and all other liquids for which other steam pumps are used.



The pumps are manufactured by the Easthampton (Mass.), Pump and Engine Co., Hon. Samuel Williston, President.

Patented in U. S., Aug. 14, 1866; reissued March 26, 1867. Patented in England, through the Scientific American Patent Agency, Oct. 8, 1868. For further information address Washington Iron Works, office 57 Liberty st., New York city.

Manufacture of Steel from Ore---The Heaton Process.

The Heaton Process, of which we shall shortly give full details, is, according to the *Mining Journal*, attracting much attention. That journal says:

"It will be recollected that the process consists in the use of an improved purifying agent, which appears to exercise a most important influence in the removal of the sole impurities which have prevented the ores of Cleveland and Northamptonshire being used in the production of the best quality iron. The Heaton process has been described by Robert Mallet, F.R.S., as one of those metallurgic advances which, both with respect to economy of production and utilization of inferior pig-iron, leave their mark indellibly on great national industries. The report of Prof. Miller, of King's College, is quite as satisfactory as that of Robert Mallet. It appears that Prof. Miller visited the works in order to be enabled to report upon the process, and certify that the metal analyzed by him was really the result of the process. The "converter" consists of a wrought-iron pot, lined with fire clay; into the bottom of this a suitable quantity of crude nitrate of soda, combined with silicious sand, is introduced, and the whole covered with a cast-iron perforated plate. The molten pig is now poured in, and in about two minutes the reaction commences. At first brown nitrous fumes are evolved, and these are followed by others of a more watery nature. After the lapse of five or six minutes a violent deflagration occurred, attended with a loud roaring noise, and a burst from the top of the chimney of brilliant yellow flame, which, in about a minute and a half, subsided as rapidly as it commenced. When all had become tranquil, the converter was detached from the chimney, and its contents were emptied upon the iron pavement of the foundery. Professor Miller took samples of the various materials used, and carefully analyzed the iron, both before and after it had been submitted to the process; and, as the result of his experiments, he states that it was proved that the reaction of the nitrate of soda had removed a large proportion of the carbon, silicon, and phosphorus, as well as most of the sulphur—the phosphorus retained was not sufficient to injure the quality of the steel produced. Steel made by the Heaton process has been tested, and the results obtained afford strong evidence that uniformity of quality is practically attainable. With regard to the principle of the process, Prof. Miller considers it to be good, and the mode of attaining the result both simple and rapid. The nitric acid in the nitrate, in this operation, imparts oxygen to the impurities always present in cast iron, converting them into compounds, which combine with the sodium, and these are removed with the sodium in the slag. The action of the sodium is one of the peculiar features of Heaton's process, and gives it an advantage over former methods."

The Chemistry of Furniture.

An unknown writer has promulgated the following facts from well known chemical laws, which every housekeeper should remember:

The substances from which furniture is chiefly exposed to injury are water, oils, alcohols, and acids. Acids act on marble. Marble is itself composed of carbonate of lime; that is, it is a compound of carbonic acid and lime. Now, the carbonic acid has a comparatively weak affinity for lime, and most other acids will prevail over it and take its place when brought in contact with it, thus destroying the texture of the stone, liberating the carbonic acid, and leaving nitrate of lime, or muriate of lime, or sulphate or acetate of lime, as the case may be, in the form of a white powder, in its place. But oils, alcohols, and water produce no effect on marble. All varnished or polished surfaces of wood, on the other hand, while not injured by acids, are attacked by alcohol.

Varnishes are composed of different gums and resins, which are generally soluble in alcohol. Many of them are made by dissolving the materials in alcohol so as to liquify them, and then, when they are applied, the alcohol evaporates, leaving the gum or resin a thin even coating over the surface. If now any alcoholic substance comes upon such a surface, whether it be alcohol itself, as used for lamps, or spirits of any kind or even wine, which contains but a small per centage of alcohol, a portion of it is dissolved, and the brilliancy of the surface is destroyed. Oils will not attack either marbles or varnished surfaces, and will do no injury except to naked wood or other porous substances which admit them into the pores, from which they cannot afterward be easily expelled. Water affects no substances except such as have open pores exposed, in which case it enters and causes the substance to swell, or such as are soluble in water, as glue in joints, and mucilage or gum-arabic, used sometimes for attaching superficial ornaments to fancy work.

REMOVAL OF THE BROADWAY BRIDGE.

Ever since its erection the bridge over Broadway, New York city, connecting Fulton street, east and west, has been an outlook for visitors and citizens who desired to get an idea of the crowd and jostle, the jam and tumble, the dangers and excitements of the Broadway passage. It has also served a good and probably profitable purpose to a photographer adjacent, who must have taken thousands of negatives of the bridge and its throngs. The bridge is to be removed in consequence of an injunction prayed for by a Broadway hatter, whose windows were darkened and whose custom was diminished, as he asserts, by its propinquity. Although the court limited the time of its removal to days, if its demolition or removal occupies a tithe of the time spent in its erection, weeks will elapse before the Leow Bridge ceases to be a notable object on Broadway, sharing the admiration of the strangers who visit the city with historic St. Paul's, the elegant Park Bank, and the substantial *Herald* office.

Few who have the least particle of artistic taste will regret its removal. At the time of its erection we spoke of its seeming massiveness, and suggested a much lighter and more graceful structure of iron or steel wire. But if passages for the convenience of foot passengers must be made across our most crowded thoroughfares, we cannot see why a tunnel with a descent of ten or a dozen steps would not serve the same purpose at a much less cost than an elevated bridge, the level of which must be reached by as many steps as the second floor of our most lofty buildings. But better than either would be some system of intercommunication that would relieve the streets now overcrowded, and distribute the mass of vehicles compelled to use only two or three main avenues of traffic.

Cure for Rattlesnake Bite.

The *Sun* says the following receipe is claimed to be an unfailing remedy, and has been tried with success in two instances where soldiers have been bitten by rattlesnakes on the Plains: Ribron's antidote to the poison of the rattlesnake —R. Iodide potassii 4 grains; Hydrarg. Chlor. Corros. 2 grains (corrosive sublimate); Bromine 5 drachms. Ten drops of this mixture diluted with a tablespoonful or two of brandy or wine, or whiskey, constitute a dose, to be repeated if necesary. It must be kept in glass-stoppered vials, well secured, as the air will affect it. This is an invaluable remedy.

DIRT wears out tools by slow oxidation. The attrition of cleanliness preserves them.

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VOL. XIX., No. 22...[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, WEDNESDAY, NOVEMBER 25, 1868.

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DURING the past twenty years, in round numbers, fifty thousand alleged new inventions have been submitted to MUNN & Co. for examination, thirty thousand applications for patents have been prepared, and twenty thousand preliminary examinations at the Patent Office have been made into the novelty of alleged new inventions. The value of this Agency is more fully set forth in the announcement in the advertising columns.

OUR STATE CANALS.—ENGINEERING SUGGESTIONS.

From the Annual Report of the State Engineer, recently published, for the year 1867, we make the following deductions:

The total amount of work done under the Engineer Department (Hon. J. P. Goodsell, being late State Engineer), is $1,413,463 60, on which the cost of Engineering is 5.7-10 per cent.

The total length of navigable canals and feeders is 893·70 miles, unnavigable feeders 5·68 miles, Chenango Canal Extension about 97 miles, or 996·38 miles in all.

The usual complaints of deficient supply of water are noted in August and September, on the Syracuse Level of the Erie Canal, and the possible advantage of a pumping supply from Oneida Lake is mentioned; the distance being 3¼ miles and the lift 63 feet. In connection with this question, remedies are discussed as to the restriction of the boat models and their tunnage; the use of steam towing power at certain locks; and the construction of additional locks at Port Byron and Syracuse. A canal telegraph is also recommended, and the gradual substitution of iron for wooden bridges.

The proper appropriations for the Chenango Canal Extension, for which $825,000 have been formerly allotted and $1,671,529 are required, are advised, and the advantages of this route explained.

The Report, among other interesting details, contains the Report in full, with a map, of the surveys made in 1866, by Samuel McElroy, C. E., for the improvement of the Hudson River, for slack water navigation from Troy to Fort Edward, about 40 miles, and a corresponding improvement of the Champlain Canal from Fort Edward to Lake Champlain, about 25 miles, with locks 225 feet by 30½ feet, adapted to 8 feet water way; and also the comparative cost of improving the Champlain Canal from Troy to Whitehall, with locks 225 feet by 25, and 7 feet water way.

This survey was made by triangulation from intermediate base lines, on the entire River Division, and all the hydrographic notes were taken in a similar way. The convenience and accuracy of this method are demonstrated by a resultant error in measurement of distance of about 1¼ feet on 40 miles survey, along a winding river, with wooded banks and numerous rifts and islands; by obtaining over 400 lines of soundings, independent of any river fluctuations; by locating the adjacent canal, property lines, streams, buildings, proposed structures, etc., between June and December, with a light field party, and at an aggregate cost of about $7,500 for the entire survey. Notes were also taken to determine the propriety of changes of canal line and level, and a reduction of the locks.

The Report discusses the Topography of the Hudson and Champlain Valley, New York Harbor Improvement, River Improvements below Troy Dam, Sketch of the Upper Hudson, Survey Extension for Flood Relief, Sketch of the Champlain Canal, General argument for Improvement, Plans and Estimates.

From this discussion it appears that a dam at the highlands on the Hudson, 150 feet high, would turn the stream into Lake Champlain and the St. Lawrence; that the remedy which New York Harbor really needs for the difficulties of navigation at Hell Gate, from the swift tidal currents, at Fulton Ferry from the winter ice-fields and tides, at the New York slips from immense deposits of silt, at Sandy Hook from a narrow, shifting, and shallow channel, would be found, by connecting New York and Brooklyn with a masonry dyke, about 400 feet wide, with two or more ship locks, and by making a ship canal of the Harlem River, so that the whole volume of the North River could go out to sea, and the present tidal flux and reflux be prevented on the East River, and the facilities of Sound and River Commerce be turned into their legitimate and natural channel at the head of New York Island: this would also solve effectually the problem of connecting New York and Brooklyn.

It is also proposed to examine the gorges of the Hudson River above Fort Edward, to determine the feasibility of a plan for retaining the freshet supplies, so as to prevent the periodical floods which have always proved so destructive below and above Albany.

The details of the Report show that on a comparison of the items of cost, the sum of $4,534, 379 will secure 8 feet water way, by the River Plan, from Troy to Whitehall, while it will cost $5,866,851 to secure 7 feet water-way, by the Canal Plan, and that the "Commercial, Military, and Mechanical advantages are distintly in favor of the River Plan;" the value of the developed mill power alone, being shown to be about $4,334,600.

The suggestions contained in this Report, furnished by an Engineer thoroughly qualified to make them, merit the consideration of all who are interested in the commercial development of our State and our City, and it is to be hoped that at no distant day they will have a practical illustration.

A NATIONAL INVENTION BUREAU.

Although we are taught to look upon Washington as the central and national city, it does not bear to the nation any such relation as London bears to the British Empire, or Paris to France. It is merely, and only, the governmental center of the nation; in no wise its principal or important metropolis. It was destroyed in the war of 1812–15 by an inconsiderable force of English troops, but its destruction did not affect the result of the struggle nor seriously move the minds of the defenders of the country.

In our late war, the danger of the conquest and occupation of Washington, so far as it might be detrimental to the ultimate success of the national government, and give the enemy a *point d' appui*, was not so much a motive for the unexampled rallying to its defence, as a national pride in the preservation of the political capital of the nation; but Washington became, from this cause, the center upon which all patriotic eyes were fixed; for all felt that the reduction and occupation of our nominal capital by the army of the insurrectionary States, would not only belittle us as a nation, in the eyes of the world, but dishearten those who looked upon it as really the political center of the country. Since then it has attained a notoriety to which neither its situation, its value as a commercial or manufacturing center, or even its being the depository of the national archives and the seat of government, entitles it.

The splendid national buildings—the Capitol, the Treasury, the Post Office, and the Patent Office—being costly and beautiful structures, built by the money of the people of the whole country, are its chief titles to respect; and among them all the Patent Office building is the one, the loss of which would be most severely felt by the people. Their national pride might be wounded and their personal purses affected by the destruction of the other public edifices which are used for the transaction of the national business; but the destruction of the Patent Office, with its store of the inventive talent of more than half a century, might be a national disaster, the results of which would be felt for a generation. Its cabinets contain thousands of models of inventions, which are exceedingly valuable as references, not only to the force of the Patent Office Department, but to thousands of our inventors and mechanics, although, in this respect, it may not be instructive to them than a museum of natural history to the "live" student of that science.

What we need is at least one national collection of new inventions, where the machines or devices are not labeled and filed away in glass cabinets, but are exhibited in operation, so that "he who runs may read." This can hardly be done by private enterprise, but should be the result of association; such an association as would demand and secure the confidence of manufacturers, mechanics, inventors, and others interested. The American Institute is the proper body to establish such a bureau in this, the commercial metropolis of the country. That it can be done without governmental aid, National or State, is evident to one who has the means of forming an opinion. That it would be self-sustaining, and even profitable, there can be little doubt. Every exhibitor to this perpetual fair would willingly pay an entrance fee for his invention, and a rent for space allotted to him, and for power employed. He could well afford it, as the action of his machinery, governed by his agent, who should be competent to explain its operation and advantages, would be a perpetual advertisement, more powerful than columns in a daily or weekly journal.

Beside this, the products, or a certain percentage of them, might be claimed by the Association, and thus another source of revenue to the enterprise be opened. Of course, such an establishment would become one of the "lions" of the city. Everybody who visited New York would think their visit to have failed of its intent if they did not see the contents of the Mechanics and Inventors' Museum.

As it is now, the barrooms or offices of some of our hotels are used as show rooms for the devices of inventors, to the annoyance of guests and the inconvenience of proprietor and employés.

Strangers with machines, which require power and material to exhibit their excellences or prove their advantages, are compelled to travel about town and locate their inventions in places hard to find and uncomfortable to visit.

A central and well-known institution such as we have suggested, we are confident, would "pay" in more senses than one, and would be a worthy adjunct to the present attractions of the city, and as popular a place of visitation as some of more than doubtful reputation so much affected by strangers.

FACILITIES FOR INTERNATIONAL COMMUNICATIONS.

At the present time there are in progress three immense works intended to facilitate the communication of the people of one country with those of another, between whom nature has placed barriers deemed by former generations as boundaries erected by the Almighty which it were almost impious to attempt to pass. We refer to the Mont Cenis Tunnel, our trans-continental railroad, and the Suez Canal. A few figures in relation to this latter work may not be out of place. It is intended to connect the Mediterranean and the Red Sea, thus uniting the Atlantic and Indian Oceans, and saving the immense detour around the continent of Africa, now necessary to reach the Indies from any portion of Western Europe. The length of the canal will be about ninety miles, having a depth of from twenty to twenty-six feet, and sufficiently wide to accommodate vessels passing each other on the transit from ocean to ocean. The total cost of this canal with the necessary docks, etc., is estimated at $100,000,000. It is evident to the most superficial observer that those who have the management of this great "cut-off" will be able to control the greater portion of the Indian trade—indeed, nearly all the commerce between Europe and India, China, and perhaps Japan.

Our great Pacific Railroad may divest a portion of this lucrative trade, but it must be considered that breaking bulk, re-shipping on cars, and transportation over railroads are costly in comparison with the conveyance of cargoes in ships which can sail uninterruptedly from port to port. The sea is the great highway of the nations; railroads are but supplementary, and we are glad that a movement has been made to connect the Atlantic and Pacific by means of a ship canal across the Isthmus of Darien, a notice of which appeared in in our last issue. It is believed that a canal can be constructed which will pass vessels of large tunnage from one ocean to the other in twenty-four hours. The suggestion is well worthy the consideration of our statesmen and capitalists.

POISONOUS DRUGS AND COSMETICS.

Our attention has been called to this subject by the reports of accidental poisoning, which for a month or so have been numerous. In this and in other cities such accidents are almost of weekly occurence. We scarcely look through our daily exchanges without seeing an account of something of this sort. The whole of it is attributable to "carelessness," according to the reports. First, a physician has written a prescription so that it can scarcely be read—a very frequent occurrence by the way—or has used ambiguous abbreviations; next a druggist has blundered in making up the preparation; and again, the blunder occurs in the family, the dose desired and its selection from the heterogeneous collection of remnants of previous prescriptions, usually kept in a dark corner with the poison for vermin, being intrusted to the highly intelligent and judicious Biddy who presides in the kitchen.

Another class of poisoning of late becoming more and more common, and for which accidental is too mild an adjective, arises from the use of poisonous cosmetics; several cases of which have been recently reported. The most important of these is one occurring in the practice of Dr. L. A. Sayre—lead poisoning from the use of one of the modern preparations for the complexion. The preparation is one in very common use in this country, and its name forms some of the conspicuous advertisments that adorn fences about vacant lots and the street curbstones.

But it is useless to find fault with an evil unless a remedy for it is possible. We have seen that four classes of individuals are in fault: the doctors who prescribe, apothecaries who put up the prescription, the people who take the medicines, and the manufacturers who make and vend the objectionable compounds. Any system of regulations then that will fully correct the evil must embrace each and all of these classes. Doctors should no longer be permitted to write their prescriptions in abbreviated Latin, in so bad a style of penmanship that it could scarcely be read, if it was an invitation to dinner. People who take medicine have some right to judge for themselves, whether the dose presented to their lips is calculated to heal their infirmities, or to send them into eternity by the run. It was only recently that an important error in the renewal of the prescription was detected by a patient of our acquaintance, who, although urged strongly, obstinately refused to use it until it could be revised by her physician. Beside this, all physicians should be obliged to put full directions as to the administration of prescriptions on the prescription itself, in place of the too ordinary words, "use as directed." This would be a check on the druggist, who would thus often be led to discover errors when they occur by his knowledge of the effects which medicines are intended to pro-

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duce, provided that he knows these effects, which, however, is not always the case.

Druggists should be competent to put up prescriptions. We believe there is no department of trade in which, as a rule, retailers know so little that is requisite to the proper conduct of their business,as in the drug trade. We were once told by a druggist doing a large prescription business, the largest in the city where he was located, that vinegar contained no acetic acid. He was only convinced of his error by a reference to the U. S. Dispensatory which lay upon his desk. Now if upon so simple a matter as this, a prominent druggist is found to be ignorant, what confidence can we have that he would be able to detect impurities in his drugs, or that he would, if a physician should order by mistake too large a dose of any powerful remedy, be able to detect the error. We believe that druggists should be made responsible in such cases as well as the physician who prescribes. If a heedless doctor orders him to put up a poisonous dose, he should not be permitted to blindly follow orders. He should do nothing whatever blindly. If he sells cosmetics he should know what they are made of; if not competent to determine this for himself, he is not fit for his business. If people are poisoned by their use, he as well as the manufacturer, should be held responsible. The examination of such articles in druggists shops, very rarely extends beyond the wrappers, if they look well and are likely to sell well, that is all that is requisite.

The habit of putting away remnants of prescriptions for future use is very dangerous, unless the greatest care is taken that they be properly labeled. Dosing should never be eft to ignorant servants.

Finally prescriptions should be written plainly,in plain English for those who speak English, with all directions in full, that the means of checking errors may be in the power of every person through whose hands they pass, and the prescription in full with maximum and minimum dose together with the dose prescribed, and the directions for its use should be fully and plainly written out and pasted upon the bottle box or envelope which contains the medicine. If these precautions cannot otherwise be secured, they should be made the subject of legislation, and laws so stringent with penalties for their violation, so severe, should be enacted, that the reforms we rccommend will be thoroughly enforced.

HOW TO HAVE A CHEAP HOT DINNER.

We happened to be present in May last at the Polytechnic Institute of London while Prof. Pepper was conducting some very interesting optical experiments to a crowded and appreciative audience.

This Institute is one of the most valuable and instructive in London, and we trust that in due time we shall have something like it—and even better—in this city.

A large hall in the building is devoted to the exhibition of novel inventions, many of which were remarkable for their ingenuity. At the time of our visit a very voluble little personage was summoning the visitors to examine a small contrivance which he called the Norwegian Cooking Apparatus. It consisted of a tin vessel or stew-pan having a closely fitting cover, and into which a piece of mutton or beef, potatoes, and other vegetables, are placed in water at the boiling point. he vessel is covered so as to be water-tight, and then carefully enclosed in a felted box, and the lid sealed. The apparatus before us had been shut up nearly three and a-half hours, and when opened in our presence, we were invited along with other half-hungry visitors to eat of the viands thus prepared, which we found well cooked and very palatable. The lecturer on the cooking apparatus remarked, that the peasant of Norway, wise in their generation, were great eaters of porridge. They found that, by boiling their mess for only five minutes, and then immediately enclosing the sauce-pan, all hot, in a little felted box, the acquired heat was sufficient to complete the cooking of the porridge and to keep it hot for many hours.

The Norwegian Government it appears took a leaf out of the peasants' book, and adopted the same plan of cooking, which has proved a success.

The lecturer went on to say that two gentlemen—perhaps himself was one of them—started from Paris with one of these little felted sauce-pans full of mutton, and upon reaching London, after eleven hours' ride, the felt covering was removed, the stew opened, and the inner man regaled with as choice a morsel as ever Englishman ate, assisted, of course, by a generous pot of beer, to which it is said English men are somewhat partial.

Now for a workingman there is nothing like a good hot meal. It adds force and power to human muscle. Therefore, in every farm, in every cottage, let the kettle be boiled every morning—let the sauce-pans containing the provisions for the day's dinner be placed to boil for five minutes, and then shut up, piping hot, in a wood box, well fitted inside with cheap felt, and the family need concern themselves no more till the dinner hour arrives. At that time the food will be found nicely cooked, and with the addition of some salt and pepper it will constitute a dish fit to set before a king. The laborer can as easily carry the little Norwegian stew-pan to the field, as he can his little tin pail.

A HINT TO OUR INVENTORS.

In our last number we made some suggestions on the use of coal and the management of coal fires. The subject seems to be worthy of still further notice. The unavoidable waste of coal, either bituminous or anthracite, in handling and transportation is enormous. At the mouths of adits and shafts at the mines the accumulation of "culm," and also at the screening places, is so great as to become an annoyance. It is worthless at the place of production, as the clean lump coal bears merely a nominal value; but if brought to the consumer it would be valuable, especially if it could be put into usable shape.

We are aware that attempts have been made to utilize this coal dust by cementing it with a glutinous hydrocarbon, and forming it into convenient bricks by pressure. For this, however, heavy and costly machinery is required, and the cost of manufacture is greater than the value of the manufactured material. By this process the anthracite coal becomes, to all intents and purposes, bituminous coal, not in much favor with cooks. If a method could be devised for consolidating the fine particles of coal wasted at the mines, at the coal yard, and in the house, an enormous proportion of the coal now utterly wasted could be used to give out the heat it contains. Some vehicle, cheap, and easily mixed with the dust, should be contrived, by which the enormous waste entailed by the crumbling of coal might be avoided. We believe it possible. Who will provide it, and thus, while benefiting himself will minister to the comfort of millions?

ANNUAL RAINFALL IN DIFFERENT PORTIONS OF THE EARTH.

A correspondent asks us to give the amount of water, rain, hail, and snow, falling upon an area of 100 square feet, during a year of twelve months, taking the average from one year to another. The form of this question is so indefinite that no satisfactory answer can be made to it. It suggests, however, some remarks in regard to the subject which may not prove uninstructive to our readers at large, and which will probably contain the information desired by our correspondent.

There are great variations in the quantities of water precipitated upon equal areas situated on different parts of the earth's surface. In some places scarcely a day passes without rain, others exist where rain scarcely ever falls. Striking a mean of all the water precipitated in any form over zones of moderate width, parallel to the equator it will be found that the fall diminishes from the equator, toward the poles. The fact is easily explained by the general principles of rainfall which may be thus stated: Rain, hail, and snow are water frozen or otherwise precipitated from the atmosphere. The amount that can fall at any locality depends, principally, of course upon the amount of water contained over that locality. There are certain places where local influences prevail to such an extent, that the latter proposition does not apply to them, but they are exceptions to a general law, which do not effect the truth of the statement. The amount of water contained in a given amount of air, is, all other things being equal, proportioned to its temperature. The hotter it is the more water it will contain, and *vice versa.* As the average temperature of the atmosphere decreases from the equator toward the poles, its capacity for moisture also decreases; hence the inference that less rain would fall in high latitudes than in lower is perfectly legitimate. It has moreover been confirmed by observation.

At London the fall is 25 inches; at Bordeaux it is 25.8; at Madeira it is 27.7; at Havanna it is 91.2; at St. Domingo, 107.6. It has been estimated that in the northern part of the United States the average number of rainy days in each year is about 134, in the southern part is about 103. The lesser number of rainy days in warmer climates is more than counter-balanced by the amount of water which falls in a given time, the tropical rainstorms being proverbially very heavy. Prof. Silliman gives the following estimate of the mean annual number of rainy days for different latitudes:

N. Latitude	Number of Rainy Days.
From 12° to 43°	78
" 43° to 46°	103
" 46° to 50°	134
" 50° to 60°	161

He also estimates the amount of rain at special points, as follows:

"The greatest annual depth of rain occurs at San Luis Maranham, 280 inches; the next in order are Vera Cruz, 278; Grenada 126; Cape Francois 120; Calcutta 81; Rome 39; London 25; Uttenberg 12.5." The rainfall in New Hampshire is about 38 inches; in New York State 36; Ohio 42; Missouri 38.26. The average for the United States is about 39.23. In the torrid zone the mean fall is 95 inches. In the temperate zones it is 35 inches. The mean fall for the two temperate zones and the torrid zone is 55 inches. An inch of water upon a square foot of surface will weigh about five and one-fifth pounds; on one hundred square feet it would be 520 lbs.; which, multiplied by the mean depth of fall over the surface of the torrid and two temperate zones, 55 inches, gives 14.3 tuns. In round numbers the mean amount of rain falling upon each acre of these zones is 5,500 tuns.

Common Sense Treatment of the Horse.

If a man does not like a horse his head is not level. We believe that the heads of our readers are level, *ergo,* they must like horses. The majority of those who like horses generally manage to own one or more of them, and owning, must be interested in knowing how to keep in good health and vigor this noblest and most serviceable of animals. The following common sense directions from the *London Horse Book* contain the most practical information in the shortest space of anything we have seen upon this subject:

1. All horses must *not* be fed in the same proportions, without due regard to their ages, their constitutions, and their work, because the impropriety of such a practice is self evident, yet it is constantly done, and is the basis of disease of every kind.

2. Never use bad hay on account of its cheapness, because there is not proper nourishment in it.

3. Damaged corn is exceedingly injurious, because it brings on inflammation of the bowels and skin diseases.

4. Chaff is better for old horses than hay, because they can chew and digest it better.

5. Mix chaff with corn or beans, and do not give the latter alone, because it makes the horse chew his food more and digest it better.

6. Hay or grass alone will not support a horse under hard work, because there is not sufficient nutritive body in either.

7. When a horse is worked hard its food should chiefly be oats; if not worked hard its food should chiefly be hay; because oats supply more nourishment and flesh-making material than any other kind of food; hay not so much.

8. For a saddle or a coach horse, half a peck of sound oats and eighteen pounds of good hay is sufficient. If the hay is not good add a quarter of a peck more oats. A horse which works harder may have rather more of each; one that works little should have less.

9. Rack feeding is wasteful. The better plan is to feed with chopped hay from a manger, because the food is not then thrown about and is more easily chewed and digested.

10. Sprinkle the hay with water that has salt dissolved in it, because it is pleasing to the animal's taste and more easily digested. [A teaspoonful of salt in a bucket of water is sufficient.]

11. Oats should be bruised for an old horse but not for a young one, because the former, through age and defective teeth, cannot chew them properly; the young horse can do so, and they are thus properly mixed with the saliva and turned into wholesome nutriment.

12. Vetches and cut grass should always be given in the spring to horses that can not be turned out into the fields, because they are very cool and refreshing and almost medicinal in their effects; but they must be supplied in moderation, as they are liable to ferment in the stomach if given largely.

13. Water your horses from a pond or stream, rather than from a spring or well, because the latter is generally hard and cold while the former is soft and comparatively warm. The horse prefers soft, muddy water to hard water, though ever so clear.

14. A horse should have at least a pail of water morning and evening, or (still better) four half pailfuls at four several times in the day, because this assuages his thirst without bloating him. He should not be made to work directly after he has a full draft of water, for digestion and exertion can never go on together.

15. Do not allow your horse to have warm water to drink, because if he has to drink cold water, after getting accustomed to warm, it will give him colic.

16. When your horse refuses food, after drinking, go no further that day, because the poor creature is thoroughly beaten.

Iron Fortifications and Great Guns.

A letter from Berlin says: "The success which attended the experiments of last summer has induced the Prussian Government to employ large blocks of hard cast metal for the purposes of fortification. A foundery has been established with this object on the artillery experimental ground, by which arrangement it is not necessary to move its ponderous productions any very great distance, whenever it is thought advisable to give Mr. Krupp an opportunity of knocking them to pieces, or endeavoring to do so. A colossal casting, weighing ninety tuns, was made there last Friday, in the presence of the Minister of War, and numerous military and naval officers, and is, unquestionably, by far the greatest that has ever been attempted on the Continent. What is considered still more remarkable than the size of this casting, was the very short time required for the process. The metal was melted in three large furnaces in the short space of three hours, but the actual casting was completed in forty-five seconds.

"The report adds, by way of comparison, that the casting of a steam hammer, weighing one hundred tuns, required in England forty-eight hours.

"An hydraulic crane is used for moving these large masses, and does its work so easily, that a shield weighing forty tuns has been moved several hundred yards and placed on the framework intended to receive it in half an hour. The plates are not fastened together by bolts or screws, but cast in such a shape as to dovetail into each other. It is intended to employ a combination of iron, earthwork, and masonry, in the new forts, and to adopt the improved methods in the coast defences first, as they are exposed to the heaviest fire.

"The Woolwich gun, which has been competing at Berlin with Mr. Krupp's, has shown a deep crack after the two hundred and sixty-fourth round, whereas, Krupp's gun has remained unscathed after four hundred rounds, and his friends are, of course, jubilant. On the other hand, an English seven inch plate, three inches of steel on four inches of iron, from the Cyclops Works, Sheffield, was too much for Krupp's ninety-six pounder—at least, only the point of the shot came through. It has been stated, since, that only a reduced charge of powder was used on this occasion. The same projectile, however, and with a similar reduced charge, had knocked an eight-inch plate of Austrian manufacture all to pieces. Both Krupp and Borsig have offered to establish works for rolling plates in Prussia."

THE losses sustained in Switzerland by the September freshets, caused by the rapid melting of the Alpine ice and snows under the effect of long continued warm south winds, amount to $12,000,000. By this calamity thousands of people have been reduced to want.

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OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING NOVEMBER 10, 1868.

Reported Officially for the Scientific American.

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In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

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83,817.—OIL BLACKING FOR LEATHER.—S. S. Allen (assignor to himself and John B. Morris), Richmond, Ind.

I claim the within specified composition as an oil blacking for leather mixed in the proportions substantially as set forth.

83,818. — FIELD ROLLER. — William W. Andrew, Grand Rapids, Mich.

I claim, 1st, The dividing board, B, provided with plates, F F, and grooves, H H, and extended forward of the frame, A, under the pole, J, where it is perforated, e e e, to receive the clevis, all constructed to operate as specified.

2d, The combination of the frame, A, box, D, rollers, C C, rods, G G, and and grooved board, B, when constructed and operating substantially as set forth.

83,819.—PIN CUSHION.—L. J. Atwood, Waterbury, Conn.

I claim a pin cushion formed of a ring or disk of fibrous material, confined between two metallic plates that are connected together by rivets or other metallic connections, as set forth.

83,820.—HAIR RESTORATIVE.—E. J. Balcear, Martinez, Cal.

Antedated Nov. 7, 1868.

I claim the within described ingredient or root, treated and prepared in about the manner herein specified for the purposes set forth.

83,821.—HORSE HAY FORK.—H. J. Beemer, Honesdale, Pa.

Antedated Aug. 21, 1868.

I claim the hay harpoon, constructed as described, and consisting of the shanks, A B, pivoted arm, c, lever, L, made in two parts, m m, and jointed at g. pivots, x i, cross bar, E, and grooved pulleys, P P', all constructed, arranged and operating as set forth and for the purpose specified.

83,822.—STIRRUP.—E. S. Bennett (assignor to himself and J. Smith), New York city. Antedated Oct. 24, 1868.

I claim a stirrup made with one side entirely open, with a device for preventing its slipping, substantially as and for the purpose set forth.

83,823.—MEDICAL COMPOUND.—E. M. Berry and L. M. Berry, Saltillo, Ind.

We claim the compound above described, substantially as and for the purposes herein set forth.

83,824.—SASH FASTENER.—J. V. Bogert, New York city, and M. R. Perkins, Portsmouth, N. H., assignors to themselves and John F. Lowell, Boston, Mass.

We claim the sliding bolt and its spring, when arranged as shown, with the projecting catch spring, substantially as and for the purpose specified.

83,825.—APPARATUS FOR PASTING LABELS.—W. E. Booraem, New York city.

I claim, 1st, Preparing (or pasting) and presenting the labels, ready to be affixed to the bottles, in the manner described, that is to say, by applying the paste to a plane or board, adapted to transfer the paste to the back side of the label, over its entire surface, and pick it up and present it for transfer by hand to the bottle.

2d, Also, an apparatus, composed of a suitable supporting surface, and yielding retaining arms for holding a supply of labels, and provided with a movable pasting board, for applying the paste to and picking up the labels, one at a time, as and for the purpose described.

3d, Also, the adjustable and yielding retaining arms, in combination with the label supporting table, whereby the apparatus may be adapted to the use of labels of different sizes and proportions, as hereinbefore set forth.

83,826.—UTERINE SUPPORTER.—J. T. Boyd, M.D., Indianapolis, Ind. Antedated Oct. 31, 1868.

I claim the curved wires, M M and B, and their corresponding grooves in the pad, A A, with their fastenings and attachments, in the manner and for the purpose substantially as set forth.

Also, the coiled springs or wires on the back of the pads, C C, arranged and attached in the manner and for the purpose substantially as set forth.

83,827.—COMBINED WATER ELEVATOR AND DAIRY.—H. N. Brooks, Bloomington, Ill.

I claim the arrangement of a coiling apartment, C, constructed and furnished substantially as described, and an automatic water-elevating apparatus, substantially as set forth.

83,828.— TYPE-CASTING MACHINE. — David Bruce, Brooklyn, N. Y.

I claim, 1st, The loose pulley, G, having a pawl, F, attached thereto, in combination with the cam wheel, D, having a notch, E, in its periphery, substantially as hereinbefore set forth.

2d, Also, in combination with the driving shaft, C, the cam wheel, D, having a cavity, J, in its face, and planes, K and L, substantially as described, and for the purposes hereinbefore set forth.

3d, Also, The combination of the upright cam lever, I, having the tappet, H, attached thereto, with the said cam wheel, D, when formed as hereinbefore described.

4th, Also, the combination of the said upright cam lever, I, and frame, B, with the horizontal registering lever, P, substantially as hereinbefore described and for the purposes set forth.

5th, Also, in combination with the frame, B, the inclined gutter, N, made and arranged substantially as hereinbefore set forth.

6th, Also, in combination with the horizontal registering lever, P, the registering plates, R1 and R2, substantially as hereinbefore described and for the purposes set forth.

7th, Also, in combination with the inclined gutter, N, and registering plate, R1, the type, M, arranged and operating in the manner described and for the purposes set forth.

83,829.—VEGETABLE CUTTER FOR ANIMAL FOOD.—R. I. Burbank, Boston, Mass.

I claim, 1st, A series of rotating carriers, A or B, constructed as shown and described, and operating in connection with a series of rotating circular saws, in the manner and for the purpose specified.

2d, A series of notched clearers, N, constructed, applied, and arranged for operation as and for the purpose set forth.

3d, The combination of all the operative parts specified, when arranged to operate substantially as and for the purpose set forth.

83,830. — HEAD BLOCK. — C. R. Bushnell, St. Anthony's Falls, Minn.

I claim, 1st, The graduated semicircle, I, resting upon the carriage, and provided with two rows of square holes, the set screw, K, armed lever, H, receding pawls, G, ratchet wheels, F D, and shaft, C, all arranged to operate in the described manner for the purpose specified.

2d, The graduated semicircle, I, when provided with two rows of square holes and the set screw, K, as herein described for the purpose specified.

83,831.—CUTLERY.—W. T. Clement, Northampton, Mass.

Antedated Oct. 28, 1868.

I claim the within described method of the manufacture of cutlery, consisting in bending the wrought iron, B, and beveling its ends, as represented, and afterward compressing it together upon the steel, and welding and drawing it, substantially in the manner and for the purposes herein set forth.

83,832.—CORN SHELLER.—D. Codd, Ottawa, Canada.

I claim, 1st, The toothed cylinder, B, and the corrugated or grooved endless belt, F, in combination with each other, the toothed surface of said cylinder moving at right angles to the direction of said endless belt, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the fan blower, S, with the toothed cylinder, B, and endless belt, F, substantially as herein shown and described and for the purpose set forth.

3d, Operating the endless belt, F, and fans, S, from the toothed cylinder, B, substantially in the manner herein shown and described.

83,833.—POTATO DIGGER.—V. P. Corbett, Alexandria county, Va. Antedated Oct. 31, 1868.

I claim the arrangement and combination of the revolving toothed cylinder or bar, C, scoop, A, with pronged front spring bars, s s s, and wings, W W, constructed and operating substantially as and for the purposes set forth.

83,834.—SAFETY SWITCH LOCK.—H. C. Cotter and George G. Greene, Fort Wayne, Ind.

We claim the stop bar, A, carrying stops, a a' a" a"', and eccentric levers, C C, in combination with the stop bar, H, having recesses, m n, the whole being constructed in the manner and for the purpose substantially as set forth and described.

83,835.—POSING APPARATUS FOR PHOTOGRAPHS.—Gustav Cramer and Julius Gross, St. Louis, Mo.

We claim, 1st, The body rest, A, when provided with flexor joints, m, and extension torsion joints, n, constructed substantially as herein described and set forth.

2d, The leg rests, B, when constructed so as to be able to follow all the movements of the human leg, and be adjustable thereto, as and for the purpose set forth.

3d, The arm rest, C, when constructed so as to be able to follow all the movements of the human arm, substantially in the manner and for the purpose hereinshown and described.

83,836.—ARTICLE OF FOOD PREPARED FROM FISH AND POTATOES.—W. D. Cutler, Philadelphia, Pa.

I claim the within described mixture of desiccated potato and fish, as a new commercial article.

83,837.—KEY-HOLE GUARD.—C. B. Davies, Dayton, Ohio.

I claim cap, A, provided with projecting arm, B, and spring, C, when used in connection with bolt, D, perforation ss described, and thumb screw, E, substantially as described and for the purposes set forth.

83,838.—CULTIVATOR.—Samuel Day, Delavan, Ohio.

I claim, in a corn cultivator, the mode of guiding the machine and shovels by means of the crank, D, and connections, with the lever, o, as and for the purposes above described.

83,839.—HARVESTER.—J. F. Earl, San Francisco, Cal.

I claim, 1st, The vertical adjustment of the cutter frame, relative to the main fraim, upon a pivot or shaft, in advance of the main axle, by means and substantially in the manner described.

2d, The arrangement of the driving gear, in combination with the vertically adjustable frame, substantially as described, whereby the hight of said frame may be adjusted without disturbing the working relation of the gear shafts.

3d, The rake-head, constructed as described, in combination with teeth applied thereto, and operating substantially as described.

4th. The manner of actuating the rakes by means of the straps or belts, and drums or rollers, and shifting clutches, operating as described.

5th, Operating the shifting clutches, by means of the rake head acting alternately thereon through the clutch levers, as described.

6th, The slotted plate, to which the middle fingers are attached, forming the box enclosing the springs, and permitting the withdrawal of the lever staple and the removal of the sickle, as described.

7th, The arrangement of the fulcrum of the reel frame in rear of and above the pivot or axis around which the sickle frame is adjusted in combination with means for simultaneously adjusting said frames, whereby the relation of reel and sickle is varied when the hight of cut is varied, as described.

8th, The hollow reel shaft, provided with the end hubs and with the central stiffening sleeve and central hub, as described.

9th, The adjustment of the steering wheel upon a horizontal axis or pivot, for the purpose of maintaining the same in a vertical position, irrespective of the position of the main frame and cutters.

10th, The attachment of the driver's stand or seat and the sickle-adjusting mechanism to the horizontal axis upon which the steering wheel is adjusted, substantially as and for the purpose set forth.

11th, The combination with the grain platform of a reciprocating rake, adapted to deliver the grain at either end of the platform, as set forth.

83,840.—SHEEP RACK.—John Elliott and William Lee, Chippewa, Ohio.

We claim the hinged covers, C D, so arranged and combined with the rack, A, as to form a roof when folded up, and grain trough when turned down in the manner as described.

83,841.—MACHINE FOR MAKING SHEET GLASS.—Samuel S. Ferris (assignor to himself and William O. Robbins), New York city.

I claim, 1st, A pair of rollers, formed hollow, and provided with means, substantially as specified, for regulating their temperature, in combination with the inclined table, g, and movable side pieces, h, for regulating the width of the melted glass passing to said rollers, substantially as set forth.

2d, The platform, K, formed of a series of plates hinged together, in combination with the rollers, b and c, and straightening roller, s, for the purposes and substantially as set forth.

83,842.—QUARTZ CRUSHER.—Edward Ford, San Francisco, Cal.

I claim the horizontally-acting batteries, A and B, when placed one above the other and acting against the vertical dies, E E, with the screen, M, and feeding the ore from one to the other, the whole constructed and operating substantially as and for the purpose herein described.

83,843.—THILL COUPLING.—Norman N. Gordon (assignor to himself and Robert Boyd), Rochester, N. Y.

I claim the combination of the closed eye, d, provided with narrow neck, f, with the jaws, a a, provided with the separated bearings or journals b, b, the whole arranged as described, and operating in the manner and for the purpose specified.

Also, in combination with the above, the sliding pressure plate, h, provided with lugs, i i, which rest upon the jaws, the said plate serving to apply the rubber block to the bearing, through media of screws, k k, as herein described.

83,844.—WINE OR CIDER MILL.—H. B. Goucher, Pecatonica, Ill.

I claim the apron, C, ropes, C', and elastic bands, D, when arranged and employed substantially as and for the purposes set forth and described.

83,845 —DREDGING MACHINE.—Andrew J. Gove, San Francisco, Cal.

I claim, 1st, The beam, E, turning about the axis, c, and the governing chain, G G', moving about the drum, H, together with the excavator, B, and its lever, D, pivoted to the beam, E, at the point, F; also the regulating chain I; the whole constructed and arranged substantially as and for the purpose described.

2d, The beam, E, and the lever, D, with its excavator, B, working in the well or opening, a, substantially as and for the purpose herein described.

83,846.—PRESSURE BLOWER.—William C. Grimes, Philadelphia, Pa.

I claim, 1st, A series of rotative bellows, c c c, in combination with the angled shafts, B B, arranged to operate substantially as hereinbefore described and for the purpose set forth.

2d, The arrangement of a series of valveless bellows between two rotative disks or obtuse cones that revolve in planes inclined, the one to the other, as herein before described, and for the purpose set forth.

3d, The semi-circular air chamber, E, in combination with the disks, D D', and the bellows, C C, arranged to operate as hereinbefore described, and for the purpose set forth.

83,847.—POTATO DIGGER.—Andrew M. Hall, Falmouth, Me.

I claim, 1st, The combination of arms, h, pivoted at i and y, plate, j, clamps, k, hand or lever piece, l, to adjust the screener, E, when desired, support the rear end of it, and still to allow of its vibrating motion, as herein set forth.

2d, The bent rods, o, when used to sustain the screen, E, allow of its vibrating motion on the parts, p, and also to aid in supporting the rear end of the plow, D, as herein set forth.

3d The adjustable wings of the rotating fans, F, as herein set forth.

4th, Moving the fan, F, and imparting a vibratory motion to the screen, E simultaneously, by means of the revolving axle, b, by the devices, and a herein set forth.

83,848.—VALVE AT THE END OF TUBES.—J. R. Hamilton, M. D., Dexter, Me.

I claim, 1st, The valve, C, formed by the partial excision of the closed end of a hollow cylinder, substantially as described and for the purposes herein set forth.

2d, The valve holder, combined and arranged with the foregoing, as and for the purpose set forth.

83,849.—PAINT CAN.—E. B. Hamlin, St. Louis, Mo.

I claim, 1st, The reinforcing band, B, when constructed with a lip, b, at its top edge, and attached to the can, A, in the manner and for the purpose herein described and set forth.

2d, The locking pieces, E, when constructed and employed, as and for the purpose herein shown and described.

83,850.—CORK-CUTTING MACHINE.—George Hammer (assignor to himself and Alfred Butz), Philadelphia, Pa.

I claim, 1st, The sliding spindle frame, D, when its live spindle, J, is actuated by the clutched chain pulley, j2, and clutch lever, k, substantially as and for the purpose specified.

2d, Operating the sliding spindle, J', by means of the double lever, B, spring, i2, and inclined plane, i1, substantially in the manner and for the purpose described.

3d, In combination with the cutting disk, C, the sliding saddle, P, when its vibrating head piece, Q, is respectively to the stops, q q, and gauge, O', arranged substantially in the manner and for the purpose set forth.

4th, The described combination of the mechanism for slicing the cork, and for tapered and cylindrical cutting, when the same are so arranged as to be simultaneously operated from one driving shaft, A, substantially as specified.

83,851.—CORN HARVESTER.—E. K. Harvey, Quincy, Ohio.

I claim the belt, F, guides, n n, belts, E E, and saw, D, combined, arranged, and operating as set forth.

83,852.—MACHINE FOR BENDING CARPET BAG FRAMES.—Henry Havell, Newark, N. J. Antedated October 24, 1868.

I claim an improved machine for making traveling bag frames, consisting of its several parts, herein described, combined and arranged substantially as described and for the purposes set forth.

83,853.—CHURN.—Silas Hewit, Seneca Falls, N. Y. Antedated October 31, 1868.

I claim, 1st, The dasher, A A', when constructed substantially in the manner and for the purpose set forth.

2d, The dasher, when constructed as described, in combination with the breakers, a a a a, as specified.

3d, The combination of the body, the frame, B, the dasher, A A', and the breakers, a a a a, as and for the purposes set forth.

83,854.—VAPOR BURNER.—Samuel Holmes, 180 High Holborn, England. Patented in England, March 23, 1868.

I claim, 1st, The combination of the insulating casing, the packed gas tight joint, and the valve constructed to operate substantially as before described.

2d, Also, in combination with the insulating casing, the packed gas tight joint, and the valve, of the lever, ix, and screw, i4, substantially as shown in fig. 2.

83,855.—CAR SPRING.—Edwin J. Horner, Wilmington, Del.

I claim, in combination with a suitable box, A, provided with an overlapping lid, D, with inner pins, l the arrangement of the concentric springs, a b and d, the three being graduated and extending one above the other, as shown, and held in position by the pins, I, for the purpose of suiting the light, medium, and heavy weight of a railroad car, all as shown and described.

83,856. — SAWING MACHINE. — Samuel Hunter, Andrew county, Mo.

I claim the plates, a a', the lower rigid the upper pivoted, provided with the orifices, c c', adapted to varying the direction of the driving shaft, substantially as described.

83,857.—AUTOMATIC CAR COUPLING.—William W. Jeffery, Greenview, and Cyrus Snyder, Middletown, Ill.

We claim the links, A' B', constructed and arranged as described, with the pins, C C, and double cam, D, in the drawheads, as and for the purpose set forth.

83,858.—PUMP.—Jacob O. Joyce, Dayton, Ohio.

I claim, 1st, The combination and arrangement of the valves, N N' and M' with the openings, U V and K, substantially as and for the purposes specified.

2d, The combination and arrangement of the piston chamber, B, piston or plunger, D, tube or cylinder, E, and discharge pipe, G, with the flues or passages, R U and V, substantially as specified.

3d, The combination and arrangement of the air chamber, A, piston cylinder, B, piston or plunger, D, tube or passage, E, and pipe, G, with the passages, RU and V, valves, N N' and M, with their openings, T, substantially as and for the purposes specified.

83,859.—ADJUSTABLE BOX FOR ARBOR, ETC.—Benjamin D. Kay and Henry E. Kay, Fall River, Mass.

We claim the brasses, B1 D2, etc., hinged in the casing, A, and arranged relatively to the arbor, M, the hinge screws, C, and adjusting screws, D1, D2, or their equivalents, substantially as and for the purposes herein set forth.

83,860.—RAILWAY TRACK CLEANER.—Richard A. Kendall and Thomas Kendall, Mineral Point, Wis.

We claim a railroad track clearer, composed of the shovel, A, attached to the check board, E, by levers, C C, and rods, D D, in combination with the hinged and divided platform,, operated by the rods, L, substantially as described, as and for the purposes specified.

83,861.—BEE-HIVE.—Isaac King, Germantown, Ohio.

I claim the combination of chamber, A, with removable chamber, B, and the interior box, D, and chamber, C, without the interposition of a diaphragm, when the parts are constructed, ventilated and arranged in the manner and for the purpose substantially as described.

83,862.—HORSE POWER FASTENER.—Richard Knott, Suisun, Cal.

I claim the arrangement of the frame, A, with arms, E E, attached to the timbers, C C, the hooks, G G, and adjusting screws, I I, for fastening the horse power to the ground, retaining it in position, and leveling it, substantially as herein described.

83,863.—STEAM GENERATOR.—William H. Laubach, Philadelphia, Pa.

I claim, 1st, The combination of the transverse pipe, a, the horizontal pipes, b, and the inner vertical feed pipes, b c, constructed substantially as described.

2d, The feed pipes, b c, in combination with the steam pipes, d, and the outer tubes, e, as set forth.

3d, The construction of the horizontal water pipes, b, and the horizontal steam pipes, d, combined as herein described.

83,864.—SLEIGH RUNNER.—Jacob Laux, Cleveland, Ohio.

I claim, 1st, The semi-disks or plates, F, radial arms, H H', in combination with the sleigh runner, in the manner and for the purpose specified.

2d, The cap, J', provided with a groove, K', as arranged in combination with the plates, J, for the purpose and in the manner set forth.

3d, The center, E, when constructed in two sections, in the manner substantially as set forth.

83,865.—VAPOR BURNER.—David H. Lowe, Boston, Mass.

I claim the reservoir, A, burner, C, perforated cap, G, and non-conducting material, D, when all are constructed and arranged to operate as shown and described.

83,866.—WEEDING-HOE.—Alfred E. Lyman, Northampton, Mass.

I claim the graduating expansive weeding hoe (or weed cutter), as substantially described and herein set forth.

83,867.—GATE.—Peter McCollum, Fayette, Mo.

I claim the gate, A A', when arranged in two parts, hinged together, so as to allow the bottom part to be folded up or thrown open as described.

83,868.—APPARATUS FOR COLLECTING PRECIOUS METALS.—James T. McDougall, San Francisco, Cal.

1 claim, 1st, Vertical or inclining iron standards, C C, with stems or bars, D D, resting on a plate or plates of copper, B, or plates of some other metal having affinity for mercury, when used for collecting the precious metals, substantially as described.

2d, Iron standards with a supporting horizontal base, on the edge of which there are projections, E E, so that, when placed side by side, open spaces, F F, will be formed between the said standards, having one or more stems or bars projecting upward, all of which serve as riffles, when placed in running water, substantially as and for the purpose specified.

3d, Iron stands, with hollow projecting stems, H, containing bars, slips, or tubes of copper, H', or other metal having affinity for mercury, communicating with the water outside through slits or openings, I I, substantially as described.

4th, Copper resting on iron, the iron resting on copper, the copper having amalgamated, silvered, or mercurialized surfaces, when placed in sluice boxes, or other apparatus, or equivalent device, designed to intercept and collect the precious metals moving with the water, in the manner and for the purposes herein specified.

5th, The metallic obstructing and collecting surfaces, or equivalent device, separately or in combination, whether placed in sluice boxes, concentrators, or other apparatus for collecting the precious metals moving in running water, substantially as described.

83,869.—BLIND HINGE.—William McKee, and Chas. H. Jordan, Washington city, D. C.

We claim, the arrangement and combination of the latch, D, with its forked head, H, when operated as herein described, and for the purpose set forth.

83,870.—MACHINE FOR CUTTING OUT GARMENTS.—W. A. McLaughlin, New York city.

I claim the slider, u, and clamping lever, t, constructed as set forth, and actuated by the arms and rock shaft, q, in combination with the follower, e', and toggles, f, actuated as specified, to operate the cutters when the feeding device is not acting upon the cloth as set forth.

83,871.—FARM FENCE.—E. G. McMillan, Norwalk, Ohio.

I claim the band, C, cap I, and stakes, D, as arranged in combination with the posts, G, and rails, A, for the purpose and in the manner substantially as set forth.

83,872.—MEDICAL PLASTER.—S. I. Merrill (assignor to D. U. Young, and M. C. Merrill), Falmouth, Me.

I claim the above-described compound of ingredients, in the named proportion, for the purposes set forth.

83,873—GUN CARRIAGE.—Alexandar Moncrieff, Woolwich, England. Patented in England, June 4, 1866.

I claim the before-described, system of mounting and working ordnance, whereby the gun is supported upon a moving fulcrum, which, on the firing of the gun, is caused to shift nearer to the gun, and farther from a counterweight, spring, or other force, while at the same time the gun is brought into a lowered position, for reloading, and is then automatically raised into position for firing.

83,874.—LAMP.—Samuel C. Moore, Boston, Mass.

1 claim, 1st, the combination and arrangement of the cap, H, cup, G, hangers, I, slide, F, and tube, B, all constructed and operating in the manner described.

2d, So arranging the chimney supporters, that the lower edge of the chimney shall extend below the level of the rim of the base plate, substantially as described and shown.

3d, The hangers or supporters, I, whether depending from the base plate or rising from the screw cup, when so arranged as to support the lower edge of the chimney below the rim of the base plate, as and for the purpose set forth.

83,875.—HORSE RAKE.—L H. Morrill, West Cumberland, Me.

I claim the sliding clutch, c, on the axle, b, together with its spring, f, chain, i, lever, g, and pin, d, set in the axle, b, all as and for the purposes set forth, the clutch being attached to the axle at the center, to make the draft upon the cattle even when the rake head is being lifted.

83,876.—GAS BURNER.—Henry B. Myer, Philadelphia, Pa.

I claim the combination of the upper tip, J, metallic crown, C, glass body, A, valve, K or K', a lower tip with side aperture or apertures, E', therein, and base, B, all constructed substantially as shown and described.

83,877.—ILLUMINATOR FOR STOVES, GRATES, ETC.—Benjamin Nott, Albany, N. Y.

I claim, 1st, The within described illuminator, hinged to a stove or other heater in the manner and answering the purpose of a door, as set forth.

2d, The hollow glass cylinders, F, having currents of air circulating through them, substantially as and for the purpose as set forth.

3d, Using glass cylinders to transmit the light from a stove or heater, when protected by adjustable doors or dampers in rear thereof, as set forth.

4th, The cylinders, F, in combination with the plates, D and E, or either of them, substantially as and for the purpose set forth.

5th, The cylinders, F, in combination with the doors, C and C', or either of them, substantially as set forth.

6th, The combination of the cylinders, F, plates, D and E, or either of them, with the doors, C and C', or either of them, substantially as set forth.

7th, The combination of the cylinders, F, plates, D and E, or either of them, doors, C and C', or either of them, with a stove, or door of a stove, substantially as set forth.

83,878.—HARROW.—William F. Osborn, Mount Pleasant, Pa.

1 claim, 1st, The combination, substantially as set forth, with a harrow, of a supporting carriage, inclosed within the harrow, and carrying devices for lifting the harrow at the will of the driver.

2d, The combination, substantially as set forth, with a supporting carriage and hinged harrow frame, of the interlocking lifting levers, for the purpose specified.

3d, The combination, as set forth, with the supporting wheeled carriage carrying a seat for the driver, of the centrally hinged sectional harrow frame, arranged to fold upon the carriage for transportation, without interfering with the driver.

4th, The combination, substantially as set forth, with the supporting carriage of the pivoted tongue and locking catch, for the purpose specified.

83,879.—WAGON BRAKE.—J. J. Pierce, Maquoketa, Iowa.

I claim the combination of the lever, K, arm, F, slot and bolt, H, and rack, L, the rock shaft, D, arms, M M, rods, N N, collars, O O, springs, R R, and bar, P, the whole combined, arranged, and operating as described.

83,880.—RAILWAY RAIL.—James Potter, Portland, Me. Antedated October 28, 1868.

I claim, 1st, The chairs, d, when secured to the sleepers, c, as described, by bolts, f, and braces, i i', as and for the purposes set forth.

2d, The base, e, in combination with braces, i i', part, m, and screw bolt, n, as and for the purposes set forth.

3d, The construction of the brace, i i', with projection, m, and slotted base, j j', operating as described, on the rail and chair.

4th, The method of attaching the whole rail, a, to the chair, by means of base, e, braces, i i, and clamps, s r t, constructed and combined as herein set forth.

5th, The combination of the divided rail, b, with the base, e, chair, d, clamps, v w, and braces, i i', as and for the purposes set forth.

83,881.—GATE.—Fitch Raymond, and August Miller, Cleveland, Ohio.

We claim the spring, F, and hinges, C, as constructed and arranged, in combination with the gate, for the purpose and in the manner specified.

83,882.—HYDRANT.—Robert Reilly, Baltimore, Md. Antedated October 27, 1868.

I claim, 1st, The combination of the parts, C D E, the two former capable of being firmly attached together, by the screw, N, with the tubular plunger, I, having the discharge pipe, J, when so arranged as to enable the operator to detach and remove the hydrant from the pipe, by simply turning the handle of the plunger, substantially as described.

2d, The combination of the packing, L, and cylinder, K, with the plunger I, walls, C C, valve, F, spring, G, and stem, H, substantially as and for the purpose described.

83,883.—HASP FOR TRUNK LOCKS.—Nathan P. Ryder, Boston, Mass.

I claim the eye, E, so attached to the hasp, D, as to allow a motion of the latter independently of the eye, as and for the purpose specified.

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83,884.—BATH ROOM RACK.—Mrs. Mary Ann H. Saurman, Philadelphia, Pa.

I claim a series of receptacles, for the purpose described, arranged and applied so that the water dripping from them will be conducted to a place of discharge, substantially as set forth.

83,885.—STEAM HEATER.—Frederick W. Schultz, and John A. Wilson, Baltimore, Md.

We claim, 1st, In combination with the elevated water back, the boiler and steam coils, made and arranged to operate substantially as and for the purpose set forth.

2d, Also, the screw thread form of the coil pipes, when so arranged in series that the threads of the adjacent pipes shall nearly or quite touch each other, and leave openings between them for the air to pass through and becomes heated, by impinging upon the extended surface, substantially as described.

3d, Also, in combination with a hot water heater, the introduction of the cold air from the top or upper part of the house, by means of a turn cap, air flue and valve, substantially as described.

4th. Also, the supplementary air flue and valve to furnish air momentarily, while the turn-cap may be veering, substantially as described.

83,886—GAS-BURNER ATTACHMENT.—Fred'k Shaller, Hudson, N. Y.

I claim the wire cone or cap, A, in combination with the support, b, and spring, c, when constructed and employed substantially as and for the purpose set forth.

83,887.—RETURN-DRIP FOR PUMPS.—James B. Stevenson, Bloomington, Ill.

I claim the combination of the funnel, conductor, pipe, hinge, guide, and spring, all arranged as described, and for the use specified.

83,888.—MACHINE FOR SPLITTING LEATHER.—John Taggart, Boston, Mass.

I claim the combination of a set of feeding rollers, (provided with mechanism for operating them) a series of rotary cutters, B, carrying frame, D, therefor, and mechanism for revolving such cutters, and imparting to the carrying frame a reciprocating rectilinear movement in order to cause such cutters to cut a sheet of leather into seperate pieces or sheets, when it is forced against them by the action of the feeding-rollers.

And in such a combination, the employment or combination of a mechanism with the cutters, such as will cause those of them on one side of the medial vertical line of their sustaining frame to revolve in directions opposite to those in which the remainder of such cutters are made to revolve, the same being for the purpose of stretching the leather in opposite ways while the cutters may be in action on it to cut it.

Also, the combination and arrangement of sharpening devices s s t, or mechanism, with the feed rollers, and the series of rotary knives or cutters, their supporting carriage or frame, and mechanism for operating it and them so as to cause them to revolve, and at the same time to move together back and forth, in a manner to separate, when presented to them, a sheet of leather into two sheets, as described, the said sharpening devices or mechanism being made to effect the sharpening of the cutters while they may be in action, as stated.

Also, in combination with the feed rollers, a series of rotary cutter s, and their carry-frame or carriage, as explained, devices for moving such frame toward the feed rollers, from time to time, as the wear of the cutters may require.

Also, in combination with the feed rollers, a series of rotary cutters and their carrying-frame or carriage, as explained. The series of tapering deflectors, i, arranged with the cutters and their shafts as set forth.

Also, the arrangement and combination of the steadying and guide plate F, with the feed-rollers, and a series of rotary cutters, provided with mechanism for operating them, as described.

83,889.—APPARATUS AND PROCESS FOR ROASTING COFFEE.—O. H. Taylor (assignor to himself, John A. Parks and Darius Allen), Brooklyn, N. Y.

I claim, 1st, The hot-air pipe B, located in the steam chamber D, in connection with the coffee-chamber A, substantially as shown and described, and for the purpose set forth.

2d, The coffee chamber A, provided with a discharge or escape-pipe, W, in which is a safety-valve, H, the condensing-pipe, I, and condenser, O, in connection with the receiver, P, for the purpose herein set forth, and substantially as described.

3d, Roasting coffee, in the manner substantially as herein described, and for the purposes set forth.

83,890.—MACHINE FOR SIZING YARN.—John S. Thomson and Kelly Girvin, Brooklyn, N. Y. Antedated October 22, 1868.

We claim the combination of rollers B and C, wedges c, spring D, brush E, and box A, provided with handles F, or their equivalents, when constructed, arranged, and operating substantially as and for the purpose set forth,

83,891.—MITERING MACHINE.—Robert F. Tompkins and H. T. Williams, New York City.

We claim 1st, The knives or cutters, N, arranged in pairs, each pair fitted on a vertical shaft, D, in such manner that they may turn, rise, and fall thereon, as described, and for the purposes herein set forth.

2d, The guides, M, attached to the arm, K, and knives, N, so as to move, in connection with the knives, as described, and for the purpose desired.

83,892.—CRIMPING PIN.—Charles N. Tyler and Augusta C. Tyler, Buffalo, N. Y.

We claim, 1st, In combination with a hair pin, H, formed with a loop at its head, the double tongue, b, substantially as described, and for the purposes, set forth.

2d, In combination therewith, the clasp or slide, a, substantially as described, and for the purposes set forth.

3d, The double tongue, b, formed with the clasp or slide, a, substantially as described, and for the purposes set forth,

83,893.—COATING AND WATER-PROOFING COLLARS, CUFFS, AND OTHER ARTICLES OF WEARING APPAREL.—S. W. H. Ward, New York City.

I claim the described means of rendering collars, bosoms, cuffs, and other articles of wearing apparel composed of paper, or compounded of cloth and paper, water proof.

83,894.—TENTER-BAR FOR CLOTH.—Frederick Willig, Joilet, Illinois.

I claim the combination of the movable horizontal bars, a, pawls, n, ratchets, m, pulleys, e, and weights, d, with cords attached, as described, perpendicular bars, f, and, g, and windlass, i, as described, constructed and arranged as and for the purpose set forth.

83,895.—MODE OF FILLING MARSHES.—John B. Wood, Jersey City, N. J., and John T. Chapman, Brooklyn, N. Y.

We claim the removable and adjustable caps, B, secured to piles, A, in combination with the adjustable flexible track, C, all constructed and arranged to operate in the manner substantially as and for the purpose herein set forth.

83,896.—SCHOOL DESKS.—William S. Wooton, Richmond, Ind.

I claim, 1, A combined school desk and seat, when the seat and desk are made to turn on separate pivots, and are so connected together that, by raising the seat, the upper angle of the desk is made to fold into the angle of the seat, in the manner and for the purposes substantially as herein shown and described,

2d, The combination of desk, B, seat, C, and the devices connecting them together, with the standards, A, and brace, D, when said parts are constructed and arranged to operate in the manner substantially as herein set forth and shown.

83,897.—HAMMER.—William Zimmerman, Quincy, Illinois.

I claim the above described hammer or instrument, when adapted to the different uses and purposes described, and constructed to operate in the manner substantially as set forth.

83,898.—MILK-CAN.—T. W. Akin, Patterson, N. Y.

I claim the bottom, B, having a downward projecting flange, when secured upon the inside of the milk can, above its lower edge, by the rivets, a, the portion below said flange being strengthened by the interior ring riveted to the body of the can, as herein described, for the purpose specified.

83,899.—HYDRANT.—James Allison, Cincinnati, Ohio.

I claim the hollow perforated pipe, H, provided with the elastic disk, I, waste passage, d, and elastic packing rings, e e, arranged to operate in connection with the the cylinder, F, having the waste passage, d, as herein described, for the purpose specified.

83,900.—WAGON.—Joseph F. Applegate, New Albany, Ind.

I claim, 1st. The arrangement of the coupling rod, F, made in two pieces, connected by a screw swivel, h, and attached at the front end, either to the sand board or to the king-bolt, and at the rear end provided with a yoke, g, which moves freely around the roller or shaft, f, in boxes, i i, on the inner sides or the two middle rails of the frame A, as and for the purposes herein set forth.

2d, The tail gate, G, provided with a strap, k, across its upper end, and with slides H H, extending below the wagon, which work on pieces, I I, on the inner side of the frame, A, substantially as and for the purposes herein set forth.

3d. The arrangement of the spring bolts, e d, in combination with the perch pole, C, sheath, D, and hounds, E E, all constructed and operating substantially as and for the purposes herein set forth.

83,901.—DRIVE-WELL.—John S. Armstrong, Delaware, Ohio.

I claim the point, C, having helical threads or feathers, b, and fitted to rotate independently on the perforated end of the tube, A, substantially as described, and for the purpose set forth.

83,902.—GLOBE-VALVE FOR STEAM AND OTHER ENGINERY.—E. H. Ashcroft, Boston, Mass.

I claim the construction of the bodies of globe, angle, check, and other valves, with bushing, made of the ordinary composition of tin and copper, in their ends, substantially as herein described.

83,903.—VALVE FOR STEAM ENGINES.—Leonard Atwood, Norwich, Conn.

I claim, 1st, Intermediate valves, between the steam chest and cylinder, to reverse the action of the engine, by changing the course of the steam after it has passed the main or induction and eduction valve, substantially as described.

2d. The tumblers, C and C, in combination with the steam passages, e, e, f, and f, substantially as and for the purpose described.

3d. The steam counter balanced valve, V, constructed as described, when arranged and operating in relation to the plate, D, substantially as described

83,904.—BOTTLE-FILLING APPARATUS.—Gustav B. Bachman, Brooklyn, E. D., N. Y.

I claim, 1st. The arrangement of one or more hinged siphons, B, loaded by weights, C, in combination with the brackets, E, and reservoir, A, substantially as and for the purpose described.

2d, The seats, D, in combination with the hinged B B, and reservoir, A, substantially as and for the purpose set forth.

83,905.—MACHINE FOR MARKING AND COVERING CORN.—Elias Barto, Tiffin, Ohio.

I claim the reversible and adjustable arms, C C, provided on one side with blocks, D, and shovel, E, and on the other, with cross bar L, on which are the adjustable blocks, M M, and spades, N N, all constructed and operating substantially as and for the purposes herein set forth.

83,906.—SELF-ADJUSTING HOOK.—William Bisbee and Fleming G. Hearn, Yreka, Cal.

We claim forming a notch, b, upon the inner side of the head or heads of the hook, B, substantially as herein shown and described, and for the purposes set forth.

83,907.—CAR-COUPLING.—Timothy B. Blackstone, Chicago, Ill.

I claim, 1st, The hollow buffer, E, constructed as described, in combination with the draw head, F, and heel, G, connected by the right and left screw, J, or other suitable device for drawing the head, F, back, substantially as specified.

2d, The combination and arrangement of the hollow buffer, E, the movably connected draw head, F, and heel, G, with the springs H and H, substantially as specified.

3d, The combination and arrangement of the beams, D, applied to the platform or end of a car, with any suitable close drawn coupling, substantially and for the purposes specified.

83,908.—BILL-FILE.—C. W. Bond, (assignor to himself and John A. Gould,) Biddeford, Me.

I claim the arrangement of the separate cards, A, covers, B, and elastic straps, a, in the manner described, substantially as and for the purpose specified.

83,909.—SEWING-MACHINE FOR EMBROIDERING.—Antoine Bonnaz, (assignor to Emile Cornely,) Paris, France.

I claim, 1st. The combination of a hook or needle with an oscillating looper, B, and the universal jointed feed bar, e, when said three elements are connected to each other by a mechanism, substantially such as described which permits of turning one or the other of said devices, without changing the relative positions of said parts to each other, for the purposes described.

2d. The universal jointed feed bar, O2, in combination with the collar, n, sleeve, R, and the operating parts which constitute the universal feed motion above described, constructed and arranged substantially as and for the purposes set forth.

3d, The combination and arrangement of parts, by which the needle-bar carrier, G, is connected with the feed bar. O2, the looper, B, and the crank, S, for imparting the movements to the several parts of the machine.

4th, The coupling and uncoupling device, substantially as herein described, for the purpose of disconnecting the parts and suddenly changing the feed, when used in combination with an embroidery machine, as described.

83,910.—SEWING MACHINE FOR EMBROIDERING.—Antoine Bonnaz (assignor to Emile Cornely), Paris, France.

I claim, 1st, The needle-bar carrier, G, the universal-jointed feed bar, O2, as herein shown and described, and the horizontal looper shatt, B, connected by means of the gearings, Z Y, shaft, W, gearing, V U, shaft, z, gearings, y x, shaft, N, and endless screws, l k, substantially in the manner and for the purposes described.

2d, The mechanism herein described, for connecting the shafts, E D, consisting substantially of disk, F, cam-grooved disk, K', lever, G, spring pawl, F', rod, D', and lever, B', substantially as and for the purposes described.

83,911.—PORTABLE FENCE.—Lewis W. Bosart, St. Marie, Ill.

I claim the combination of the post, B', panels, A, and wedges or keys, F, substantially as shown and described.

83,912.—STENCIL PLATE FOR NUMBERING BARRELS, &C.—James Henry Bradford, Westborough, Mass.

I claim the combination of two or more concentric curves of the nine digits, for making numbers in horizontal or other right lines, substantially as described.

83,913.—PICTURE NAIL.—B. H. Bradley, Waterbury, Conn.

I claim a picture nail, having formed upon its end the hook, C, and combined with the head, D, constructed so as to be attached to the end, of the hook, substantially in the manner herein set forth.

83,914.—DRAFT EQUALIZER FOR WAGONS.—Charles C. Bradley, Brodhead, Wis.

I claim the combination and arrangement of the power equalizer, consisting of the duplicate poles, and the two whiffletrees, and two neck yokes, each with a long and a short arm, and the pulleys attached to the wiffle trees and poles, for the purposes herein set forth, or substantially the same.

83,915.—TICKET HOLDER.—James Bramble and Albert H. Nirdlinger, Fort Wayne, Ind.

We claim the ticket holder as constructed of a single metalic plate, provided with a fastening device, C, the edges of the said plate being bent over on three sides to form grooves, a, adapted to receive the ticket and the upper edge of the plate being cut out at d d, leaving a central tongue, e, which is bent over, substantially as herein shown and described, for the purpose specified.

83,916.—STEAM GENERATOR.—H. G. Brooks, New York City.

I claim, 1st, A boiler, in which the ends of the inner sheets of the laps or seams are prolonged beyond the fastening rivets, and chamfered or beveled, in the manner and for the purposes set forth.

2d, The offset, flanged outwardly, in the manner described, on the end of the forward course of the cylinder portion of the boiler, in connection with the smoke arch or box, substantially as and for the purposes set forth.

83,917.—CARRIAGE.—Charles Brown (assignor to himself and Aaron G. Salmon), Adrian, Mich.

I claim the use and manufacture of the side straps, A and C, combined with the corner iron, B, by means of the portions, a and b, substantially as set forth and described.

83,918.—MACHINE FOR DRESSING HOP POLES.—C. D. Brown, Bainbridge, N. Y.

I claim the construction of the three wheels, A, B, and C, and their combination with and arrangement on the shaft, E, substantially as herein shown and described.

83,919.—FASTENING HORSE POWERS TO THE GROUND.—Walter Buchanan, Jr., Main Prairie, Cal.

I claim the straps, C and b b, and the beams, D D and G, together with the links, g g and m, with their keys, the whole constructed and operating substantially as and for the purpose herein described.

83,920.—DUMPING WAGON.—William S. Bullock and Hugh Hanigan, Wilmington, Del.

We claim the combination of the curved springs, s, bed frame, a, applied and operating in connection with the hind axle, d, and body, m, as herein shown and described, for the purposes specified.

83,921.—TATTING SHUTTLE WINDER.—E. S. Burns, La Crosse, Wis.

I claim a machine for filling tatting shuttles, consisting of the rotating disk, F, operated by the wheel, C, and having the stationary loop, c, and the pivoted loop or hook, d, arranged thereon, all substantially as shown and described.

83,922.—APPARATUS FOR MAKING EXTRACTS AND ESSENCES.—Edward E. Burrough, Baltimore, Md.

I claim, 1st. The vessel, D, constructed with the concave bottom, d, plug, d', flanges, c c' e, and cocks, J K, all arranged to operate in the manner and for the purpose set forth.

2d, The arrangement of said vessel with the vessels, I and B, substantially as described.

3d, The arrangement of said vessels, D I B, with the casing, G, substantially as described.

4th, The arrangement of the vessels, D I B, with the pipe, E, substantially as described.

5th, The arrangement of said vessels, D I B, and pipe, E, with the reservoir, F, and pipe, f, substantially as described.

6th, The arrangement of stove, A, pipe, E, vessels, F G B I D, cocks, J K L, plug, d', and flanges, c' e, substantially as described, and for the purposes specified.

83,923.—AUTOMATIC GATE.—W. W. Burson, Rockford, Ill. Antedated October 31, 1868.

I claim, 1st, The combination and arrangement of levers, F F', pendants, H H', connecting pieces, I I', arm, K, and ways, D D', when the whole are constructed and operated substantially as and for the purpose set forth.

2d, Constructing the way, D or D', with suitable curve to overcome the gravity of swinging arm, K, substantially as specified.

3d, The combination and arrangement of the pendants, H H', wire, m, and posts, E E', operating substantially as and for the purposes set forth.

83,624.—FLUTING MACHINE.—S. G. Cabell (assignor to Flora B. Cabell), Quincy, Ill.

I claim, 1st, The cap plate, F, when constructed and arranged substantially as herein described for the purpose of furnishing a support and bearing for the cylinders, I, as set forth.

2d, The combination of the lever, C, bolt, D, cross bar, E, frame, G, and cap plate, F, when constructed and arranged to operate substantially as described and for the purpose set forth.

3d, The cap, L, and bolt, g, when constructed and arranged to operate substantially as herein described and for the purpose set forth.

4th, In combination with the cylinder, H, the cap, M, on the end of the crank, N, constructed substantially as herein described and for the purpose set forth.

5th, In combination with the cylinders, I, the covers, O, and thimbles, P, when constructed and arranged substantially as described and for the purpose set forth.

6th, The fluting rolls for fluting machines, constructed with ogee fluting, of the form herein described, and shown in figs. 4 and 5.

83,925.—BRONZE DRESSING FOR LEATHER.—M. S. Cahill, Boston, Mass.

I claim a bronze dressing for leather, composed of spirit varnish and aniline fuschine, substantially as herein set forth, either with or without the addition of aniline blue or bronzed powder, all as described, as a new article of manufacture.

83,926.—HAY AND COTTON PRESS.—Stephen Q. Carey, Waxahatchie, Texas.

I claim the arrangement, herein described, of the shaft, J, pulleys, I I', cord, G, pulleys, H H', platen, P, press box, B, capstan, L, cord or chain, N, and large flanged pulley, K, all constructed and operating substantially as set forth.

83,927.—MACHINE FOR APPLYING REINFORCING PATCHES TO BUTTON HOLES OF COLLARS.—H. F. Cary, Boston, Mass.

I claim the process herein described, of applying to paper, before or after its conversion into collars, reinforcing button hole patches, automatically cut from gummed strips, continuously moistened in their passage through the machine, substantially as described.

Also, in a machine for applying strengthening patches to button-holes of collars, a trough and guides, for moistening the cement applied surface of the ribbon.

83,928.—WIND WHEEL.—Chandler P. Chapman, Madison, Wis.

I claim combination of the pivoted main vane, F, connected to the governor by the rod, a, with the pivoted auxilliary vane, G connected by rod, d, to the vane, F, for the purpose of changing the position of the wheel to the wind, substantially as described.

83,929.—BRAKE FOR VEHICLES.—E. M. Chumard, Pittston, Pa.

I claim the arrangement of the crank shaft, D, rods, g g, arms, x x, slotted guides, m, loops, h h, and brake blocks, l, with the brake bar, C, and operated by the lever, K, and spring, l, all constructed substantially as set forth.

83,930.—ELASTIC CALK FOR BOOTS AND SHOES.—Gilbert H. Clemens, New York city.

claim 1st, A rubber heel calk, molded or made to fit on to a boot or shoe heel, in combination with the metallic disks, C, in the bottom of the same, all as and for the purposes specified.

2d, A rubber heel calk, molded or made to fit on to a boot or shoe heel, in combination with a band or bands, strap or straps, to pass around the instep of the boot or shoe, for the purpose of holding the heel calk on the heel of the same, as shown and described, and for the purpose set forth.

3d, A rubber heel calk, molded or made to fit on to a boot or shoe heel, the bottom of which is made with a series of corugations, constructed substantially as shown and described, and for the purpose specified.

4th, The combination of a rubber heel calk, made to fit on the heel of a boot or shoe, with a strap or straps to hold it thereon, the metallic disk, C, and the corrugations on the bottom of the calk, all substantially as shown and described, and for the purpose specified.

83,931.—CULTIVATOR.—Leander Clifton, Barry, Ill.

I claim, 1st, The safety detaching device for a cultivator plow, consisting of the curved piece, B, and spring piece, H, substantially as and for the purposes described.

2d, The cultivator, constructed of the iron bow, A A', curved piece, B, spring pieee, H, ring, I, pieces, F F', standards, C C', having bent and slotted ends, a a', rod, D, nuts, b c, brace, K, and plows, G G', all combined arranged and operating as and for the purposes described.

83,932.—SCRUBBING BRUSH.—A. E. COLMAN, New York city.

I claim as a new article of manufacture, the brush, made up of bristles and rubber, substantially as herein recited, and for the purposes set forth.

83,933.—TIP FOR CHAIR LEG.—Edward Coogan and Howard Miller, Washington, D. C.

We claim, 1st, A tip for chairs and other articles of furniture, constructed substantially as shown and described.

2d, The combination of the tips, B, the elastic dividing plate, F, and the leg or post, A, substantially as and for the purpose shown and described.

3d, The within described method of securing the tips to the legs or posts of furniture, it being by means of the shank, D, the recess or chamber, E, and a suitable cement.

83,934.—ROLLING PIN.—Warren Cook, Arsenal, Pa.

I claim the kitchen utensil, consisting of the cylinder, A, having a cavity, B, the removable perforated cap, a, and the detachable handles, C D, provided respectively with bands, b d, substantially as herein set forth and shown, for the purposes specified.

83,935.—FASTENER FOR GLOVES.—Ph. Courvoisier, Paris, France.

I claim the cap, A, provided with points, a, and containing the spring bolt, b, in combination with the bottom, B, provided with points, e, and with a neck, f, substantially as and for the purpose described.

83,936.—PARLOR BEDSTEAD.—Mark Crosby, Boston, Mass.

I claim, 1st, In combination with the side pieces, A and B, the hinged pieces, F F', when attached to the front part, K, in such a manner as, when closed, to form a finish around the corner and across the side piece, A, and underneath the projecting end of the top, D, substantially in the manner shown and described, as and for the purposes set forth.

2d, In combination with the base, G, the end pieces, A and B, having their ends rounded off so as to allow them to turn down into the base, G, when closed, and when open to form a continuous side piece at the bottom, without the addition of intermediate pieces, substantially in the manner described, as and for the purpose set forth.

83,937.—HORSE RAKE.—Samuel L. Denney, Christiana, and John N. Chalfant, Chester county, Pa.

We claim, 1st, The lever D, rod E, arm F, spring, G, and curved stand, H, when arranged to operate in the manner and for the purpose described,

2d, The combination of the serrated rim, I, rod, E, lever, D, arm F, spring, G, and curved stand, H, when operating in the manner and for the purpose set forth.

3d, The combined tooth guard, guide, and pressure bearer, when constructed as here shown and described.

83,938.—DERRICK.—J. B. Drake and William H. Hutson (assignors to themselves and J. Sill), Montoursville, Pa.

We claim, 1st, The guide, E, in combination with the arm, D, and the hoisting device, when operating substantially as set forth.

2d, The combination of the rope, J, having the two parts, j j', with the crane, D, when operating substantially as described.

3d, The arrangement of the sled shaped base, A, with the above described derrick, substantially as and for the purpose set forth.

4th, The combination and arrangement of the sled, A, mast, C, crane, D, rope, J, j j,, guide, F, pulleys, G H I, and braces, c c, substantially as shown and described.

83,939.—MACHINE FOR CUTTING SLATE.—Thomas R. Drummond, Hartford, Conn.

I claim, 1st, A box knife, or a box with any number of knives attached, whereby a slate may be cut at one blow or descent of such knife or knives, substantially as herein described.

2d, The elastic cushion, K, pressed upon by either a weight or by springs, arranged substantially as and for the purposes set forth.

3d, The elastic cushioned bed, C, in combination with the shell, a, arranged and operating substantially as and for the purpose specified.

4th, The arrangement of the cutter box with two or more knives combined, so that a piece of slate may be cut at one blow, and either with or without punches at the corners.

83,940.—REEFING AND FURLING SAILS.—Frederick B. Dunton, Centre Lincolnville, Maine.

I claim the arrangement of the setting ropes, 1, the centre reefing brails, having reefing loops, l, and passing through the eyelets, m n o, the swiveled brailing rod, and the outer furling brails passing through the eyelets, j, with reference to the sail, A, yards, B C, and jack stays, d e, the hauling parts of each gear being united in sets, and arranged upon different sides of the mast, whereby the sail may be spread, furled, or reefed by hauling on any one set, as herein shown and described.

83,941.—ROTARY STEAM ENGINE.—Alfred Duvall, Baltimore Md.

I claim, 1st, An elliptical piston, constructed with elastic or yielding surfaces upon its points of greatest diameter, substantially as shown and described.

2d, The chambers, D D, formed within the piston, substantially as shown and described.

3d, The combination of the elliptical piston, B, the chambers, D D, and the set screw, H, bars, G, and springs, F, substantially as shown and described.

4th, The arrangement of the packing rings, K and I, rubber or elastic packing, J, spring, L, and set screw, M, substantially as shown and described.

83,942.—BRIDGE.—James B. Eads, St. Louis, Mo.

I claim the levers D, forming a compensating expansion joint, with the horizontal members, C, for the purpose of preventing the horizontal movement of the arch under the effect of a moving load on the bridge, when constructed and arranged as herein described.

83,943.—CORN PLANTER AND CULTIVATOR.—Alfred Edmister, Westfield, Ohio.

I claim, 1st, The combination and arrangement of the plows, P and T, draught rods, R V, and rods or bars, Q U W S, with each other and with the frame, A, to enable the machine to be conveniently adjusted for use as a planter or cultivator, substantially as herein shown and described, and for purpose set forth.

2d, The combination and arrangement of the seed box, N, guard plate, O, gage wheel, L, tube and valve plate, k, disk, J, vertical shaft, H, operated from the axle, B, by means of the bevel gear wheel, F and G, and the conductor or spout, M, with each other, substantially as herein shown and described, and for the purpose set forth.

3d, The combination of the pivoted notched bars, Y, connecting rod, Z, and lever or handle, X, with the bars or rods, U Q W, from which the plows, P and T, are suspended, substantially as herein shown and described, and for the purpose set forth.

83,944.—JOINT AND COUPLING FOR CULTIVATORS.—William H. Edwards, Moline, Ill.

I claim, 1st, The joint and coupling for cultivators, consisting of the side plates, G, the clasping plates, g, and veritical rod, H, all constructed and arranged substantially as herein described, and for the purpose set forth.

2d, The method of connecting the vertical rod, H, to the frame of the cultivator by means of the eye bolt, I, and plate, J, or their equivalents, substantially as herein described, for virtically and laterally adjusting the shovel beams, as set forth.

83,945.—CAR COUPLING.—John Elbertson (assignor to himself and Jesse L. Conner) Kirksville, Mo.

I claim, 1st, The sliding bars, P, with their springs, r, and pins, s, in combination with the spring, G, lever, K, and its attachments, herein described and shown, substantially as and for the purposes specified.

2d, In combination with a bumper, having springs, E, attached thereto, as described, the plate, D, lever, F, guide, c, bar, H, springs, b, and link, n, constructed and arranged substantially as specified.

3d, The lever, L, with its ratchet and pawl as described, bar, m, and link, n, when constructed, arranged, and operating substantially as and for the purposes herein set forth.

83,946.—ARITHMETICAL GAME.—Stephen A. Emery, Boston, Mass.

I claim the arrangement and construction, and mode of operation, as above described, by which instruction in the science of arithmetic is secured, in combination with an entertaining amusement.

83,947.—LIFTING JACK AND CANT HOOK.—Daniel Fasig, Rowsburg, Ohio.

I claim the combination of the hook, G, on the lower part of the forward edge or side of the standard, B, with the slotted adjustable lever, C, substantially as herein shown and described, and for the purpose set forth.

83,948.—FABRIC FOR FLOOR COVERING, WAINSCOTING, ETC.—Michael Flurscheim, New York city, assignor to Henry Whittemore, Passaic, N. J.

I claim, as a new article of manufacture, the herein described portable wainscoting or floor covering, composed of narrow strips of wood, secured upon cloth or its equivelent, as described.

83,949.—FOLDING LOUNGE.—Duncan Forbes, Chicago, Ill.

I claim the combination of the two part bolster, D D, body, H, and folding part, A, the whole being arranged substantially as and for the purpose set forth.

83,950.—TUCK CREASER FOR SEWING MACHINES.—H. W. Fuller, Brooklyn, N. Y.

I claim, 1st, The lever, which carries the nipping points, the spring, and the base plate, all formed of or from the same piece of metal, substantially as described.

2d, The adjustable tongue plate and tongue, combined with its supporting plate, as specified.

3d, The combination, with the base plate and supporting bolster, of the scroll spring, constructed as described, and for the purpose set forth.

4th, The combination, with the adjustable tongue plate and tongue, of the graduated scale, whether on the cloth smoother or the base plate.

5th, The combination with the adjustable tongue plate and tongue, and the graduated scale, of the nipping points, D D'.

6th, The gage, G, in combination with the clamping block and the tucker proper, constructed substantially as described, and all separately adjustable with respect to the needle of the sewing machine, and for the purposes set forth.

8,951.—MACHINE FOR PACKING TEA, COFFEE, ETC.—John Garsed, and Clayton Denn, Frankford, Penn., assignors to John Garsed.

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We claim, 1st, The plunger, N, attached to or connected with a rising and falling shaft, I, placed within a tube, J, connected with a treadle, G, and arranged substantially as shown, so that the plunger will have a rising and falling and also a turning movement communicated to it, for the purpose herein set forth.

2d, The rising and falling box, B, with the fixed bottom plate, F, in combination with the plunger, N, all arranged to operate substantially as and for the purpose specified.

3d, The box, P, in combination with the fork, Q, rising and falling box, B, and plunger, N, all arranged substantially in the manner as and for the purpose set forth.

83,952.—BEEHIVE.—J. C. Gaston, Cincinnati, Ohio.

I claim, in combination with a beehive, the angular passage way, a d, and receptacle, c, arranged and used in the manner described.

83,953.—BEER COOLER.—Joseph Gecmen (assignor to himself and Leopold J. Kadish), Chicago, Ill.

I claim, 1st, A series of corrugated pans, constructed and arranged substantially in the manner and for the purpose shown and described.

2d, In combination with a series of pans, arranged as specified, I claim a trough, B, provided with a strainer, b, and outlets, a, arranged substantially in the manner and for the purposes described and set forth

3d, The opening, L, in the inclosure, A, below the series of cooling pans, for the purposes specified.

83,954.—SAWING MACHINE.—Jason C. Gillett, Holly, Mich.

I claim, 1st, The arrangement of the driving pulley, A, with reference to the platform upon which the operator stands, and to the levers, H H1, and connecting link, H2, substantially as shown and described.

2d, The arrangement of the driving pulley, A, crank shaft, with its disk, C, crank, D, and cross head, E, for giving motion to the saw, substantially as shown and described.

83,955.—TOBACCO CUTTER.—Edward L. Gilman, and Theophilus S. Smith, Somerville, Mass.

We claim a tobacco cutter, constructed and operating substantially as shown and described, that is to say, with the knife, D, the rods, e, springs, g, cap, F, and tray, C, in combination with the box, A, and either with or without the match box, J.

83,956.—SWAGE FOR SAWS.—H. H. Gridley, Auburn, N. Y.

I claim, 1st, The raising of the cutting edge of the saw tooth by means of the swage, c, herein described, and for the purpose set forth.

2d, The swage for up-setting saw teeth, having the triangle, c, formed thereon, as described and for the purpose set forth.

83,957.—CURTAIN FIXTURE.—Benjamin Handforth, Chicago, Ill.

I claim providing one end of a curtain roller with an angular spindle, to operate in connection with an angular bearing, or with pins, to operate in connection with stops, upon the support for the roller, so that said roller can be locked or unlocked by a longitudinal movement thereof, substantially as herein described.

83,958.—SAW HORSE.—Cyrus H. Hardy (assignor to himself and B. L. White), Bath, Me.

I claim the clamp, C, herein described, sliding longitudinally between the frames, A B, of a saw horse, in combination with the frame or lever, D, by which it is operated.

83,959.—NUT CRACKER.—Chas. Hayden, Collinsville, Conn.

I claim the nut cracker, consisting of the stationary jaw, A, and pivoted lever, B, when the former is made with extensions, a b D, and provided with the clamping screw, substantially as herein shown and described.

83,960.—REVOLVING TABLE.—Julius S. Heator, Ovid, Mich.

I claim the arrangement of the metal box so cket, B, the tube, C, cone nut, c, and rotating table, D, in combination with the caster, E, as constructed, and operating substantially as and for the purposes herein set forth.

83,961.—JOURNAL BOX.—George H. Henfield, San Francisco, Cal.

I claim, 1st, The frame, C, having a center, b, secured to the shell, A, by pins, d d, and dovetailed ends in the recesses, h h, in combination with the soft metal bearings, B B, separated by the single longitudinal bar, b', substantially as described.

2d, The frame, C, surrounding and separating longitudinally the soft metal bearings, B B, the latter secured to the shell, A, by pins, e, and the former by pins, d, and dovetail recesses, h h, protected and strengthened by the corner pieces, k k, cast upon the shell, as herein shown and described.

83,962.—HARROW.—H. M. Hickman and B. G. Devoe, Vandalia, Ill.

We claim, 1st, The central hub, A, constructed substantially as described and set forth

2d, The combination of the hub, A, and the beams, B, substantially as illustrated.

3d, The hub, A, the standard, C, the draw bar, D, the brace, F, and the spring brace, E, all arranged substantially as described and set forth.

4th, The covering, I, of rubber or other suitable substance, upon the rod, G, as and for the purposes set forth.

83,963.—TOOL HOLDER FOR LATHES.—W. O. Hickok and George W. Reisinger, Harrisburg, Pa.

We claim the employment, in combination with the improved tool holder, herein described, and a screw-cutting tool narrowing from the top downward, of a tapered wedge, c, for adjusting the tool to cut threads of a right or left pitch, substantially as and for the purpose described.

83,964.—COFFIN.—Francis H. Hill, Chicago, Ill.

I claim, 1st, So connecting and arranging a movable glass frame, B, in a coffin lid, that the same may be depressed and moved down beneath the lid, and restored to place again, substantially as herein described.

2d, So hinging or connecting said movable frame, B, with and in the coffin lid, that the same may be opened upwards and closed again, substantially as specified and set forth.

3d, So connecting and arranging the movable frame, B, with and in the coffin lid, that it may be moved back beneath the lid, or opened upwards, substantially as and for the purposes shown and described.

83,965.—LUBRICATOR.—Timothy Holland, New York city.

I claim the combination of the rib, j, on the neck of the oil holder, D, and the collar, g, formed and applied as described, substantially as and for the purposes set forth.

83,965.—RAILWAY CAR COUPLING.—D. D. Howe, Beaver Dam, Wis.

I claim the buffer, B, constructed as described, of the fixed part, C, and the movable part, D, operated by the spring bolt, H, yoke, E, and lever, F, whereby the mouth of said buffer is expanded or contracted, substantially as described for the purpose specified.

83,967.—RETAINING DEVICE FOR DOORS, ETC.—Levi T. Howell (assignor to himself, William Sharp, and Smith Fisher), Camden, N J.

I claim a retaining device, consisting of a curved plate, A, its projection, a, and lug, b, extending from the projection parallel to the plate, all substantially as and for the purpose described.

83,968.—PISTON FOR DEEP WELL PUMP.—Charles Jarecki (assignor to H. Jarecki & Company), Erie, Pa.

I claim the steel valve seat, D, provided with the concentric collar, e, adapted to be clamped between the shoulder, f, of the detachable crown, A, and the top of the section, B, whereby the valve is held rigidly in place, as herein shown and described for the purpose specified.

83,969.—DOUBLE WALLED PITCHER.—Godfrey Jepson (assignor to himself and Thomas F. Bryan), Chelsea, Mass.

I claim the arrangement of the hollow flanged screw, E, hollow flanged nut, F, and washer, W, with the outer and inner walls of a double-walled pitcher, substantially as and for the purpose specified.

83,970.—HAND-SPINNING MACHINE.—James L. Johnson and J. Wilson Foust, Evansburg, Pa.

We claim the combination of pulley, C, having a vibrating support, the ratchet, a, pawl, b, and the pulley, D, having an adjustable support, all constructed, arranged and operating substantially as and for the purpose described.

83,971.—VALVE FOR MELODEONS.—Edgar A. Jones and Julius A. Bidwell, Sturgis, Mich.

We claim, 1st, The bearer, C, constructed as described, with its lower edge slotted to fit over and play upon the staple, h, in the under side of the valve, whereby the lateral movement of the bearer is prevented, as herein described for the purpose specified.

2d, The spring, D, when formed as described, together with the regulating screw, E, when employed for the purposes and used set forth.

83,972.—MACHINE FOR CUTTING SUGAR INTO BLOCKS.—Gilbert D. Jones, Brooklyn, E. D., N. Y.

I claim, 1st, The combination of the dividers or pins, b and e, arranged to project at suitable distances apart from surfaces or tables, in lines corresponding to the desired profile of the blocks to be produced, and made to approach and recede from each other at intervals, to effect splitting of the slab into blocks of uniform size, substantially as herein set forth.

2d, The table, D, provided with dividers or cutters on its face, and hinged or arranged to swing relatively to a table, E, also provided with dividers or cutters, for operation in concert therewith, essentially as specified.

3d, The combination, with the table, E, provided with dividers or cutters, and arranged to have up-and-down play or motion, of a hammer, I, operating at intervals to strike and depress said table, essentially as specified.

4th, The combination, with the hammer, I, of a spring, N, arranged to give impetus to the hammer at starting, for action in concert with or on the table, E, substantially as described.

83,973.—STAY FOR COLLARS.—S. Kaufman, Fairbury, Ill.

I claim the detachable inner stay or lining, B, and the narrow detachable band, C, applied to the collar, A, as described and shown for the purposes specified.

83,974.—MANUFACTURE OF SUGAR.—Walter Knaggs, Clarendon, Jamaica. Antedated Nov. 7, 1868.

I claim, 1st, The combined processes for manufacturing sugar herein shown and described.

2d, The application of a combination of manganese and oxygen, combined or uncombined with a base.

3d, The double cover to the evaporating tray, composed of the curved outer case, J, and the inner inclined plates, B, constructed and arranged as described for the purpose specified.

83,975.—HARVESTER.—J. M. Knepley, Jersey Shore, Pa.

I claim the independent spring arms, l and l', having the pulleys, e, attached thereto, and arranged to operate in connection with the chain that drives the reel of a harvester, substantially as described.

83,976.—MACHINE FOR BUNDLING WOOL.—H. T. La Roy, Richmond, Ill.

I claim the arrangement, herein described, of the hinged sections, c d, the fixed sections, a b, connecting rods, E, four-armed frame, B, guide rods, D, the belt, F, lever, G, and yoke, H, all operating as shown for the purpose specified.

83,977.—SLED BRAKE.—J. Latta and L. Snyder, Bethlehem Centre, N. Y.

We claim the curved levers, Ix Ix, in combination with the sliding bar, F, and fixed rod, D, whereby, as the longer lever is raised, the curved ends of both levers are forced between the bars, F D, to hold them in a fixed position, and under the levers, H H, inoperative as herein shown and described.

83,978.—TOY WATCH.—Joseph Laubereau (assignor to J. de Susini), Paris, France.

I claim the combination of the pulleys, f g, elastic string, d, and friction lever, a e, with each other and with the watch case, substantially as described for the purpose specified.

83,979.—CORN PLANTER.—E. B. Lawrence and C. Quick, Lakeville, Ohio.

We claim, 1st, The seed slide, G, provided with the arm, g, arranged to be operated by the cams, b, upon the wheel, C, substantially as described.

2d, The stops or lugs, d, secured to the wheel, C, in combination with the lock bar, K, arranged to operate as described.

3d, The combination of the slide, G, and the levers, H and I, arranged as shown and described.

83,980.—BOOKBINDING.—J. S. Lever, Philadelphia, Pa., assignor to R. C. Browning, Orange, N. J.

I claim the within described means or method for cementing the muslin or other surface material upon the boards of book covers.

83,981.—PUNCHING MACHINE.—Warren Lyon, New York city.

I claim the construction and arrangement, hereinbefore described, of the lever, J, and pinion, I, slotted toothed sector, H, pitman, G, punch stock, E, guide, F, and frame, A, for the purpose set forth.

83,982.—HEAD BLOCK.—A. C. Martin and Wm. Ritchie, Hamilton, Ohio.

We claim, 1st, The arrangement of the block, L, loosely on the shaft, G, between the beveled rings, N O, to produce a traversing or feeding movement, substantially as and for the purpose described.

2d, The combination of the four segmental portions, m, and the portion, l, of block, L, with the shaft, G, substantially as and for the purpose specified.

3d, One or more pawls, with an oscillating block, in combination with the rotary shaft, G, substantially as and for the purpose described.

4th, The pawl-shipping mechanism, consisting of the ferrule, e, and plate, g, in combination with the pawls, z, operating in the manner and for the purpose described.

5th, The ring or ferrule, e, springs, x, and plate, g, in combination with pawls, z, in the manner and for the purpose described.

83,983.—SASH FASTENER.—W. K. Marvin, New York city.

I claim, 1st, A sash fastener, composed of one or more sliding jaws, or equivalent compressing and holding devices, in combination with a double cam or eccentric, shaft, and handle for actuating said jaw or jaws, substantially as and for the purposes set forth.

2d, The herein described construction and arrangement of the two-jawed sash-fastening plates placed together and recessed to receive the double cam or eccentric, in the manner specified, the under or lower plate being slotted to receive the end of the cam shaft, and to admit of the movement of the same in the direction of the length of the said plate, as and for the purposes set forth.

83,984.—FEED CUTTER.—Norman McLeod, Clio, S. C.

I claim, 1st, The knives, L L, when made in the shape described, and attached to the arms, M M, in the manner set forth.

2d, The circular screen, B, composed of two parts, the upper one of which is provided with a spout, P, and hinged to the lower portion, which is rigidly secured to the frame, A, all constructed in the manner and for the purpose set forth.

3d, The combination of the arm, I, with the ratchet wheel, J, pawl, K, feed roll, E, and knives, L L, whereby the said parts are made to operate together substantially as and for the purpose set forth.

4th, The arrangement and combination of the shafts, C C, cutters, M L, screen, B, feed table, F, rolls, E G, ratchet, J, pawl, K, and arm, I, substantially as described and shown.

83,985.—IRON FENCE-POST.—William Merrell, Kent, Ohio.

I claim the fence post, A, formed with groups of studs, a a a a a, holes, c, and wings, C, all substantially as and for the purpose set forth.

83,986.—HOOP SKIRT.—Isaac T. Meyer, and James F. J. Gunning, New York city.

We claim, 1st, The combination with the hoop skirt, of an adjustable bustle, made up of springs so hinged, pivoted, or connected at their ends to the skirt, and provided with straps uniting them to the waistband at points or in lines intermediate of the ends of the springs, as that said bustle, by letting out or taking in said straps, may be readily raised or lowered, substantially as and for the purpose herein set forth.

2d, The trail, C, made up of springs hinged, pivoted, or otherwise connected, at their ends, to the skirt, in such manner as that said trail may, at pleasure, be let down or thrown up and back out of the way, essentially as shown, and described.

83,987.—HAMES FASTENING.—Charles Morgan, Waumandee, Wis.

I claim the hames fastener, constructed as described, of the bar, A, provided with a socket, C, to receive the end of the bar, F, carrying the hook, B, which bar is held in place by the slide, D, all operating as described, whereby, when the bar, F, is released by the slide, the hooks are detached from each other, as herein shown and described.

83,988.—FIRE KINDLER.—Issachar Morris, Clinton, Ill.

I claim the burner, B, made conical, or tapering towards its orifice, for the purpose described, in combination with the cup, C, sack, c, containing pumice stone, or other porous substances, and handle, A, substantially as described.

83,989.—SHUTTER WORKER.—Louis Muller and Cornelius Hood, Hartford, Conn.

We claim 1st, The combination of the box or casing, f, with the wheels, d, and e, and the pivot, g, all arranged as described.

2d, The combination and arrangement of the button or arm, l, having the connecting rod and handle, k, with the lever, m, for the purpose of securing the blind or shutter when closed, and for operating the slats, substantially as described.

83,990.—REGULATING GAS BURNER.—Henry B. Meyer, Philadelphia, Pa.

I claim, 1st, The glass body, B, fig. 2, having a small aperture in its bottom, in the manner and for the purposes set forth.

2d, The glass body, B, with its small aperture at the bottom, for gaging the gas, in combination with the metallic base, A, and lava or other non-metallic tip, C, all constructed and arranged as and the purpose specified.

3d, In combination with the above-described burner, the wire gauze or other fibrous valve, resting upon the small aperture, at the base of the glass body, B, as and for the purpose set forth.

83,991.—DIVIDED CAR AXLE.—J. K. Nelson, Greenpoint, N. Y.

I claim the divided car axle, A, constructed as described, with the revolving self-lubricating box, C, removable collars, e, and flexible collar, f, substantially as and for the purpose herein set forth.

83,992.—POTATO AND CORN PLOW.—Charles F. Noftz, Toledo, Ohio.

I claim the combination of the screw, K, nut, b, and jointed levers, J J, for adjusting the position of the wings, I I, substantially as and for the purpose herein shown and described.

A plow, consisting of the combination of the beam, A, handle, D, standard, F, arrow head share, H, adjustable wings, I I, adjustable coulter, B, and adjustable draft chain, C, that works in the up-and-down adjustable notched plate, L, all made, arranged and operating substantially as and for the purpose herein shown and described.

83,993.—BOILER FEED WATER REGULATOR.—James K. P. Nourse, West Medway, Mass.

I claim 1st, The combination, with the vessel, C, and float, F, of the pump, P, the bent pipe, d, and its gate, g, contained within the said vessel, and connected to the said float, the whole being arranged substantially as herein shown and specified.

2d, In combination with the arrangement of parts claimed in the preceding clause, the steam whistle, H, pipe, a, and lever, h, connected with the float, F, as specified, the whole being arranged substantially as herein shown and set forth.

83,994.—SCAFFOLD.—Frank Odenbaugh, Middletown, Pa.

I claim a portable platform or scaffold, having end pieces, A, platform, B, ladder rounds, a, pin, b, axle and wheels, c, crank and shaft, d, ratchet and pawl, f, cross bars, g and h, ropes, i p r and u, and staples, as described and shown, constructed and arranged substantially as herein specified.

83,995.—HORSE POWER.—T. G. Palmer, Shultzville, N. Y.

I claim the herein-described brake combination, consisting of the lever, C, rubber, D, support, E, and trigger, F, or their equivalents, all constructed and arranged as and for the purpose specified.

83,996.—MANUFACTURE OF SOAP.—Henry A. Pease, Hartford, Conn.

I claim, the manufacture by cold and hot process, and combination of these two processes, above-described, together, thereby obtaining a soap which will harden in two hours, when, by the old process, it requires about five days.

83,997.—IMPLEMENT.—William K. Rairigh, Rural Valley, Pa.

I claim the implement herein described, constructed and arranged in the manner and for the purpose set forth.

83,998.—MACHINE FOR SPINNING SHEET METAL.—Adrian Rais, Waterbury, Conn.

I claim, 1st, The combination, with the metal holding clamp or dies, the one being fixed on a stationary arbor, and the other upon an arbor capable of sliding longitudinally, of a plunger or sliding bolt, to force the movable clamp against the stationary one, and a toggle jointed lever for operating said plunger, substantially as shown and set forth.

2d, Dividing the bearing or journal box of the sliding arbor longitudinally, and hinging the two parts together, substantially in the manner and for the purpose set forth.

3d, The combination of the sliding carriage, F, the spinning rollers, their transverse slide rests, and the screws for regulating the position of said rests, so as to adjust the spinning rollers with relation both to each other and to the metal to be operated on, substantially as herein shown and set forth.

4th, The arrangement of the plates upon which the spinning rollers are mounted, the same being pivoted to and adjustable upon the transverse slide rests of the carriage, F, as and for the purposes specified.

5th, The method of automatically spinning to a pattern, by the employment in connection with the spinning rollers, their sliding carriage, and the hinged or vibratory frame, on which said carriage moves, of a pattern plate, a guide pin for following said pattern, and a weight, or its equivalent, operating upon the free end of the vibratory frame, so as to hold at all times the guide pin against the pattern, under the arrangement herein set forth.

6th, The combination of the sliding carriage, its actuating screw shaft, and the vibratory frame on which it moves, of an adjustable plate, H, to which the frame is hinged, as described, the said plate carrying a pulley and shaft, connected with the driving shaft of the machine, and communicating motion to the screw shaft, substantially in the manner and by the means herein shown and set forth.

7th, The movable half nut, in combination with the sliding carriage, and its actuating screw shaft, under the arrangement and for operation as set forth.

83,999.—PLOW FENDER.—S. J. Reed, Middletown, Ohio.

I claim the curved fender, e g, in combination with lever, f, constructed, arranged, and connected with a plow, in the manner and for the purpose substantially as described.

84,000.—MOP HEAD.—Otis Root, Wendell, Mass.

I claim a mop head, consisting of the frame, A B, with the sleeve, C, secured to the handle, I, by means of the spurs, e, and the end of the handle protruding through the sleeve, and turning in a socket in the cross head, D as herein shown and described.

84,001.—MACHINE FOR SCOURING, BLACKING, AND FINISHING LEATHER.—F. William Rust, Umatilla, Oregon, assignor to himself and A. E. Rogers and A. C. Gibbs.

I claim, 1st, The scouring blocks, H, hinged to the pendulum rod and held in place by rods, G, working through the cross heads, F, and provided with springs, substantially as described.

2d, The hinged levers, I, attached to the swinging frame, and arranged to operate or adjust the scouring block, H, substantially as set forth.

3d, Suspending the scouring apparatus upon a yielding support, and providing it with a lever and weight, arranged substantially as described, for the purpose of adjusting the scourers to the thickness of the lever operated upon, and also to regulate the pressure of the scouring devices, as described.

4th, The hollow pendulum, or its equivalent, for holding the blacking, and feeding it upon the leather while in operation, substantially as set forth.

5th, The perforated cross pipe, T, or its equivalent, when arranged to move with the scouring or smoothing devices, for distributing the blacking evenly over the surface of the leather, as described.

6th, The platform, B, provided with a series of balls, C, secured loosely in its under side, substantially as set forth, for the purpose of enabling it to be moved in any desired direction, while the machine is in operation.

84,002.—POTTING AND PACKING PLANTS.—Benjamin L. Ryder, Chambersburg, Pa.

I claim the above described mode of potting and packing plants with rectangular masses of earth about the roots, such masses fitting closely against each other, and against the sides of the crate or large box in packing, substantially in the manner and for the purposes set forth.

Also, the above described close jointed sectional box, or its equivalent, for the purpose of forming the rectangular masses of earth and for potting and packing plants, substantially in the manner above described.

84,003.—MANUFACTURE OF ARTIFICIAL STONE.—Carl Schaeffer, Elizabeth, N. J.

I claim artificial stone, formed of the ingredients herein specified, and treated repeatedly with sulphuric acid, substantially in the manner set forth.

84,004.—RAILROAD CAR VENTILATOR.—Wilhelm Scharrath, Bielefeld, Prussia.

I claim forming the walls, ceilings, or partitions of permanent or temporary habitations, wholly or in part of porous material, covered wholly or in part with fibrous or textile fabric, leaving a space between said walls and the fibrous material, as herein set forth for the purpose of ventilation.

84,005.—WASHING MACHINE.—Oscar Schimmel, Chemnitz, Saxony.

I claim, 1st, The aprons, d, in combination with the beaters, B, and tub, A, substantially as and for the purpose described.

2d, The double crank, E, and sliding boxes, a, in combination with the suspended beaters, B, substantially as and for the purpose described.

84,006.—HARVESTER.—Jacob Siebel, Manlius, Ill.

I claim, 1st, In the construction of harvesters, connecting or coupling the frame supporting the binding platform to the main frame, A, by means of hinges or joints, P, arranged at or near the center of said main frame, so that it may oscillate upon said hinges to admit of the raising and lowering of the cutter bar without tipping the binding platform, substantially in the manner and for the purposes specified and shown.

2d, In combination with said binding platform and main frame, A, hinged as described, the lever, L, so connected and arranged that the driver, from his seat, on the main frame, can operate the machine in the manner and for the purposes set forth.

3d, In combination with a harvesting machine having a raking platform with a rear delivery, a binding platform, arranged close behind the raking platform, and hinged to the main frame at or near its center, substantially as described, so that the grain can be raked directly from the raking to the binding platform, and otherwise operating substantially as specified.

84,007.—MECHANICAL MOVEMENT.—J. A. Shanner, Plainview, Ill.

I claim the combination, with the wheels, F and G, of the segments, H and I, and the rack, E, arranged to operate substantially as and for the purpose described.

84,008.—VENEER.—Henry F. Shepherd, Framingnam, Mass. Antedated October 31, 1868.

I claim a compressed and burnished veneer, applicable as wood hangings and for other purposes, substantially as specified.

84,009.—WAGON WHEEL.—Silas Shirley, Rockford, Ill.

I claim the wheel described, consisting of the box, A, beveling blocks, B, with curving flanges, b b, friction plates, D, rods, c, and caps, E, the whole being combined and operated in connection with the spokes of an ordinary wheel, substantially in the manner and for the purpose described.

84,010.—BEEHIVE.—Simon Shrock, New Philadelphia, Ohio.

I claim, 1st, The combination and arrangement of the central hive, C, provided with comb frames, H H, sliding face, G, feed box, D, slant board, S, and central tube, b, all constructed and operated in the manner and for the purpose set forth.

2d, The combination of the central hive, C, slant board, S, central tube, b, openings, K, honey boxes, I I, provided with corresponding openings, and ventilating boxes, L L, all constructed, arranged, and operated, substantially as described.

3d, The combination of the drawers, a' a', tubes, a a, and slant board, S, all constructed, arranged, and operated as set forth.

4th, The arrangement of the central hive, C, slant board, S, central tube, b, honey boxes, I I, ventilating boxes, L L, feed box, D, drawers, a' a', and tubes, a a, all constructed and operated as set forth.

84,011.—PAINT FOR BUILDINGS, ROOFS, ETC.—J. H. Smith, and George O. Smith, Chicago, Ill.

We claim a paint composed of the ingredients herein named, and compounded substantially as herein set forth.

84,012.—RAILWAY CAR MOVER.—Ezra Springer, Davis, Ill.

I claim, 1st, The driving wheel, D, in combination with the driving gears, arranged and operating conjointly, as and for the purpose substantially as specified.

2d, The lever, Q, rod, R, and stay, P, in combination with the arm, N, feather keys, and shifting gears, applied to the purpose set forth.

3d, The racks, A', sliding dog, C', in combination, arranged in the manner and for the purpose set forth.

84,013.—ANIMAL TRAP.—William A. Stack, Hillsborough, Md.

I claim the arrangement of the box, B, the rotating wheel, having the trap door arms, c c1, c2 c3, the stop, m, pivoted bait holder, h, spring, o, wall, D, and metallic bait box, E, when the said parts are constructed and arranged to operate in the manner described.

84,014.—STEAM ENGINE STEAM CHEST.—William Stamp, Susquehanna Depot, Pa.

I claim the construction of the wire packing, inserted in both surfaces of the joint to be made, substantially as herein described.

84,015.—BIT HOLDER.—Charles H. Stockbridge (assignor to signor to himself and Osmore O. Roberts), Northampton, Mass.

I claim the bit stock, formed of the clamping jaws, e, set in grooves having curved bottoms, in combination with the contractile spring, i, and sleeve, d, substantially as set forth.

84,016.—CULTIVATOR.—Alferd F. Stoner, West Unity, Ohio.

I claim, 1st, The spiked roller, B, in combination with the spring concave or toothed bar, M, arranged and operated substantially as set forth.

2d, Also, the arrangement of the hiller, E, in combination with the share C, in the front part of the frame, and the pulverizing roller and concave substantially as described.

84,017.—HORSE HAY FORK.—Ole O. Storle, Norway, assignor to himself and J. B. Smith, Milwaukee, Wis.

I claim the parts, B F, and G, in combination with the screw on shaft, A substantially as described.

84,018.—COFFEE AND TEA POT.—R. Strickland, Albany, N. Y.

I claim, 1st, A coffee or tea pot, having a strainer hinged to it inside, and applied over the orifice at the base of the spout, substantially as described.

2d, The hinged strainer, C, provided with a weight, b, operating substantially as described.

84,019.—MACHINE FOR WELDING TUBING.—John E. Tencate, Pittsburg, Pa.

I claim, 1st, The arrangement of the rolls, A and B, guides, e, levers, C and D, and mandrel, F, provided with enlargements, x, and x1, the whole being constructed, arranged and operating as herein described, and for the purpose set forth.

2d, The scrapers, y, in combination with the rock shaft, P, provided with oblique slots, 4, constructed, arranged, and operating substantially as herein described, and for the purpose set forth.

84,020.—COFFEE POT.—Hermann Thal, and Gustav Schlottmann, New Haven, Conn.

I claim the arrangement and combination of the strainer, C, tubular neck, g, flanged mouth piece, f, gutter, d, cap, h, perforated disk, i, and vessel A, all constructed and operating substantially as and for the purpose shown and described.

84,021.—GAS MACHINE.—William Thompson (assignor to H. B. Myer), Cleveland, Ohio.

I claim, 1st, The bellows, B B, for forcing air into the receiving bag, as described, in combination with the carbureters and purifiers.

2d, The combination of receiving bag, C, and bellows, B B, substantially as set forth, with the upper and lower carbureters.

3d, The arrangement of the bellows, B B, the large air bag, C, the passage pipe, D, and the perforated coil pipe, D', substantially as set forth.

4th, The coil partitions, G G G, filled with sponge or other equivalent material, forming a lower carbureting chamber, substantially as set forth in combination with the purifier.

5th, The combination of the purifying chamber, S, and the upper carbureting chamber, substantially as described.

6th, The pipe, T, and cock, T', for conveying residue or surplus oil from the carbureting cylinders, substantially as described.

7th, The combination of the bellows, B B, the receiving bag, C, the passage pipe, D, the coil partitions, G G G, the chamber, S, the pipe, T, and cock, T', when the said parts are arranged, combined, and operating as and for the purposes herein set forth.

84,022.—PACKING FOR JOINTS OF STEAM ENGINES.—William J. Towne (assignor to the Silver Lake Manufacturing Company), Newtonville, Mass.

I claim the application of a glazing or coating to the exterior surface of a packing, substantially as and for the purpose described.

84,023.—RAILWAY CHAIR AND SUPPORT.—Aaron Van Guysling, West Albany, N. Y.

I claim, 1st, The railroad chair support, consisting of the hollow supports, A connected by the tube, B, the chairs, C, having the fixed lip, c1, and the

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detachable lip, c2, the key bolt, D, the rubber block, G, the wooden block F, and the connecting bar, E, said chairs being slotted to receive the bent ends of the connecting bar, and for the passage of the wooden blocks, all arranged as described for the purpose specified.

2d, The chair, C, fitting over the hollow supports, A, and constructed as described, having the fixed lip, c1, detachable lip, c2, and the key bolt, D, and provided with an opening in its side for the introduction of the rubber block, G, which is kept in place by the sliding door, H, as herein set forth for the purpose specified.

3d, The combination of the horizontal metallic bar or tie, B, with the vertical hollow supports, A, substantially as herein shown and described, and for the purpose set forth.

84,024.—MAGAZINE IN BASE-BURNING STOVES.—Jasper Van Wormer and Michael McGarvey, Albany, N. Y.

We claim, 1st, Attaching to the ordinary contracted reservoir a neck, having its lower end enlarged, substantially as and for the purpose described.

2d, The method of attaching the neck to the reservoir, substantially as set forth.

84,025.—HAND-PEGGING MACHINE.—F. J. Vittum, Newburyport, Mass., assignor to W. N. Ely

I claim, 1st, A hand pegging machine, so constructed, arranged, and adapted as to its several parts, that, while the machine is held to the work, as it passes over it, with one hand, the movements of the awl and peg driver, and of the feeding devices, shall be actuated or managed with or by means of the other substantially as described.

2d, So constructing, arranging, and adapting the parts of a hand-pegging machine, as to operate the same, by means of a crank, turned by the hand of the operator, substantially as described.

3d, Arranging and adapting a crank handle, cam, and spring in a hand-pegging machine, in combination with the awl and peg-driver bars, or either of them, substantially as and for the purposes described.

4th, Arranging and adapting a crank handle and cam, in a hand-pegging machine, in combination with an awl or piercing or pointed instrument, as a feeding device, substantially as described.

5th, The ratchet bar and pinion, in combination with the awl or peg-driver bar in a hand-pegging machine, substantially as and for the purposes described.

6th, Constructing the bar, C, in connection with the dog, G, so that the latter may operate without the aid of a spring, substantially as described.

7th, The combination of the portable frame with crank handle, cam, spring, and piston, all constructed to operate substantially as described.

84,026.—REEL FOR YARN, ETC.—F. Voegtli (assignor to A. Voegtli), Montgomery City, Mo.

I claim the reel, C, and its shaft, B, to operate the finger, d, pinion, D, finger d1, pinion, D', and indicator, d2 d3, substantially as set forth.

84,027.—MUSICAL INSTRUMENT.—W. Vogel, Norwich, Conn., assignor to Ezra Durand.

I claim 1st, The arrangement of the diagonal dampers, L, with relation to the bridges, F, sound board, c, and strings, G, of the dulcimer, as herein shown and described.

2d, The construction of the bridges, F, stiffening end bars and central frame, E, and curved braces, H, beneath the sound board, c, all arranged as described for the purpose specified.

84,028.—HORSE RAKE.—J. E. Voiles (assignor to himself and J. W. Hutchings), Madison, Ind.

I claim a releasing device for the teeth of revolving horse rakes, composed of the coil spring, A, roller, C, and vibrating cross head, D, when arranged and operated substantially as shown and described.

84,029.—CULTIVATOR.—Joseph Vowles, Milford, Mich.

I claim 1st, The mold board, L, constructed substantially as shown and described.

2d, The combination of the mold board, L with a cultivator.

3d, The construction of the wedge, N, and its arrangement with reference to the tongue of a cultivator, or for any equivalent purpose, substantially as shown and described.

4th, The arrangement of the hangers, H H, with their teeth, M M, with reference to the wheels of the machine, substantially as shown and described.

5th, The arrangement of the sub-tongue, F, frame, E, sector, D, lever, C, hangers, H and K, and braces, I, substantially as shown and described.

84,030.—PUMP FOR COMPRESSING AIR.—C. W. Wailey, New Orleans, La., assignor to New Orleans Pneumatic Propelling Company.

I claim the combination of the concave heads, G and G', with the vertical sections, A A', of a pump, through which flows a continuous stream of water, when the valves of the induction ports are placed in said heads, and are operated by the springs, d and d', substantially as set forth.

84,031.—SASH STOP AND HOLDER.—Felix Walker, New Orleans, La.

I claim the combination of the double flanged plate, A, with notches, n n, and secured to the window frame, with the pivoted catch, C, having two arms, one being weighted, as shown, all operating as set forth.

84,032.—SHUTTER FASTENER.—Benjamin D. Washburn, Boston, Mass.

I claim the construction and arrangement of the piece, A, with the projections, a a and b, the latter extending below the former, which formed in one piece, as and for the purposes herein set forth.

84,033.—DROPPING PLATFORM FOR HARVESTERS.—George Wellhouse, Akron, Ohio.

I claim the arrangement and combination of the roller, H, pinion, I, segment, J, and platform, D, in the manner substantially as set forth.

84,034.—MOP WRINGER.—George Wells and S. A. Haynes, Island Pond, Vt.

We claim the bail, B, arranged with relation to the bail, A, uprights, D, plates, E, G, H, I, J, and rollers, C C, as herein described and operating in the manner and for the purpose specified.

84,035.—WATER WHEEL.—George W. Wesley, Troy, Pa.

I claim a water wheel having buckets of a concave or depressed outer surface, and with a corresponding convex or raised inner surface, in combination with the side issues or escapes, for the purpose and in the manner set forth and described.

84,036.—COMPOSITION TIP FOR BILLIARD CUES.—Albert Wetherbee, Waltham, Mass.

I claim a tip of a billiard cue, made of vulcanized rubber, one part, and pulverized chalk, more than one part, intimately mixed, and baked in combination, all substantially as and for the purpose described.

84,037.—STEAM RADIATOR.—Charles Whittier (assignor to himself and Benjamin F. Campbell), Boston, Mass.

I claim, 1st, Constructing each section on opposite sides, near the ends, with an aperture, a, of same shape as aperture, d, of body of radiator, substantially as and for the purposes described.

2d, Connecting the alternate ends of the radiator, by means of lugs, b b b b, etc., and bolts, c, etc., constructed substantially as described.

84,038.—PRESERVING MEAT.—Wilhelm Wiesmann, Bonn, Prussia.

I claim, 1st, The within described process of preserving meat, by first coating the pieces of meat with powdered saltpeter and olive oil, and then storing them away in a hermetically closed vessel, with intermediate layers of charcoal filled bags, as herein set forth,

2d, The vessel, A, provided with perforated movable shelves, a, and closed by a disk, e, and lid, c, leaving an oil space, which is filled through stop cocks, h i, all as shown and described.

84,039.—PUNCH.—George C. Wilder, Lawrence, Kansas.

I claim combining with said combination, the spring, E, as and for the purpose described.

84,040.—APPARATUS FOR SIZING GLASS CYLINDERS.—S. R. Wilmot, Bridgeport, Conn.

I claim the arrangement of the several fingers, a, operated so as to size the cylinder by opening the said fingers upon the inside or closing them upon the outside of the said cylinder, substantially as set forth.

84,041.—TREATING CAST IRON FOR THE MANUFACTURE OF CAR WHEELS.—Henry M. Woodword, St. Louis, Mo.

I claim, 1st, The herein described improved process for producing cast metal car wheels, substantially as and for the purpose described.

2d, Car wheels produced by the herein described improved process, as a new article of manufacture, substantially as and for the propose specified.

84,042.—SUSPENDER FASTENING.—Wendell Wright, Bloomfield, N. J.

I claim the double clamps, B, having teeth on their inner faces, and provided with slides, h, said clamps being hinged together by the collar, f, and removably attached to the buckle, A, by means of a snap hook, a C b, formed on the latter all constructed and arranged substantially as herein shown and described,

84,043.—MACHINE FOR MAKING HORSE SHOES.—Jacob Zept, Troy, assignor to James T. Walker, Albany, N. Y.

I claim the arrangement of the sliding arm, e, and its corrugated wheels, d, with the vertical shafts, a, and wheels, e, and b, operated by the shaft E and shaft K, with its cam, Z, all substantially as shown and described.

2d, The horizontal notched clutch, V, and sliding dies, U U, in combination with the vertically reciprocating male die and former i, substantially as herein specified.

3d, The vertically reciprocating male die, i, provided with a pressing and creasing shoulder, and with a projecting guide, all as herein shown, in combination with the dies, U U, substantially as herein specified.

84,044.—CONSTRUCTION OF FIRE PROOF HOUSES.—William A. Berkey, Grand Rapids, Mich.

I claim, 1st, The combination of the iron straps, C, and furring, D, with the joists, B, and lath, E, for the purpose substantially as described.

2d, The floor strips, L, when attached to the deafening partition, K, in the manner described, for allowing the mortar, M, to be interposed, in the manner and for the purpose substantially as described.

3d, The combination of the construction for suspending the ceiling and the construction for sustaining the floor, as described, with the interposed mortar, for preventing the burning of the timbers in such construction, and the passing of water or sound, as set forth.

REISSUES.

61,907.—APPARATUS FOR STIRRING, MIXING, HEATING, COOLING, AND EVAPORATING LARD AND OTHER SUBSTANCES.—Dated Feb. 5, 1867; reissue 3,183.—Elisha M. Allen, New York city., assignee of Giles R. Williams.

I claim the continuous flange, C, secured to the shaft, B, by arms, ax, leaving an opening, bx, between the flange and shaft, in combination with a receptacle, A, whose bottom is curved concentrically with said shaft, substantially as described, for the purpose specified.

35,528.—PIANO WITH MELODEON AND TREMOLO ATTACHMENT.—Dated June 10, 1862; reissue 3,184.—Division A.—Lafayette Louis, Boston, Mass.

I claim the arrangement of a melodeon tube board (including reeds and swell) above the keys and below the sounding board of a piano-forte, in the manner and for the purposes and substantially as described.

Also, so combining and arranging a melodeon tube board with a piano-forte that the performer can instantly, and at pleasure disconnect the melodeon tube board from the piano-forte keys, in the manner substantially as herein set forth.

Also, the combination of a tremolo attachment with the melodeon.

Also, in combination with a piano-forte, a melodeon having a connection of the bellows with the tube board by means of a tube.

35,528.—WIND MUSICAL INSTRUMENT.—Dated June 10, 1862; reissue 3,185.—Division B.—Lafayette Louis, Boston, Mass.

I claim in combination with a rotary tremolo valve, a tremolo actuating wheel placed upon the tremolo valve shaft, or directly connected therewith, so as to actuate the rotary tremolo valve, substantially as described.

Also, in combination with a wind musical instrument, a rotary wind actuated bellows, substantially as described.

29,495.—SKATE.—Dated May 29, 1860; reissue 3,186.—John Lovatt, Newark, N. J.

I claim, 1st, The adjustable hooked clamps, D D', or their equivalents, for fastening skates, arranged to be tightened and adjusted by means of an adjusting screw.

2d, Constructing a skate having a supporting plate, with a projecting piece or lug, to prevent the boot from slipping forward, and clamp fastenings adjusted by means of an adjusting screw.

3d, The combination of the movable slotted blocks, E E', or their equivalents, with clamps, D D', and the adjustable screw, G, arranged substantially as described and for the purposes specified.

70,490.—TIP FOR THE FEET OF CHAIR LEGS.—Dated Nov. 5, 1867; reissue 3,187.—Edward S. Winchester, Boston, Mass.

I claim an elastic foot or tip of rubber or other material, for the leg of a chair, having its means of attachment in an external rim, made to embrace the lower portion of the leg or foot of a chair, substantially as described.

9,781.—MOP HEAD.—Dated June 14, 1853; extended seven years; reissue 2,957, dated June 2, 1868; reissue 3,188.—Colby Brothers & Co., Waterbury, Vt. assignees by mesne assignments of Harvey Murch.

We claim, 1st, The combination of a socketed cross head with a rigid binder, that is to say, one having rigid or inflexible ends connected directly with each other, substantially as and for the purpose specified.

2d, The combination of a socketed cross head with a rigid binder, having its ends connected directly together, and a single fastening for holding the binder to the handle itself in such a position as to clamp rags, etc., substantially as and for the purposes set forth.

3d, The combination of a socketed cross head, handle, and a metallic binder, having rigid or inflexible ends connected directly to each other, constructed and arranged in such manner that the rigid or inflexible ends will be allowed to move freely by a graduated movement up and down on or over the handle itself, or the socket thereon, and hold or aid in holding the cross head to the handle when the parts are in clamping position, substantially as set forth.

4th, The combination of a metallic cross head wieh a handle and a rigid metallic binder, having inflexible ends connected directly with each other, constructed or arranged in such manner that the rigid or inflexible ends of the binder will be allowed to move freely up and down on the handle, or a metallic socket thereon, so as to hold or aik in holding the cross head to the handle when the parts are in clamping position, substantially as set forth.

5th, The combination of a metallic cross head, socket, handle, and a metallic binder, having rigid or inflexible ends, connected directly together, the latter being constructed or arranged in such manner that the rigid or inflexible ends will be allowed to move freely up and down on or over the handle itself, or the socket thereon, and hold or aid in holding the cross head to the handle when the parts are in clamping position, substantially as set forth.

15,735.—HARVESTER.—Dated Sept. 15, 1856; reissue 3,189.—Division E.—William Gage, Buffalo, N.Y., and Andrew Whiteley, Springfield, Ohio, assignees of Wm. Gage.

We claim, 1st, The shoe, M, or an equivalent thereof, which, when disconnected from the frame of the harvester, to which it is connected, leaves the finger bar of the cutting apparatus entirely disconnected from said frame, and which shoe has, in combination, the guide way, i, the horizontal slot, k, and the projections, l l, fitted to receive the axial bolt, e, or equivalents of these parts, for the purposes specified.

2d, The combination of the shoe, M, or an equivalent thereof, constructed with the guide way, i, the horizontal slot, k, and the projections, l l, with the coupling frame, F, or an equivalent thereof, which enables this shoe to be moved, in respect to the main frame and the plane of the cutter's driving wheel, substantially as first herein described, for the purposes specified.

3d, In combination with the main frame of the harvester and the shoe, M, or an equivalent thereof, which is constructed with the guide way, i, the horizontal slot, k, and the projections, l l, the coupling frame, F, or an equivalent thereof, which has its inner end connected to said frame by the axis, g, or an equivalent thereof, and its outer end connected to the shoe by the axis, e, or an equivalent thereof, and having no other axis than these two between the main frame and shoe, for the purposes specified.

4th, In combination with the main frame of a harvester, and with the shoe M, or an equivalent thereof, which is constructed with the guide way, i, the horizontal slot, k, and the projections, l l, fitted to receive the axial bolt, e, or equivalent of these parts, the skeleton coupling frame, F, or an equivalent thereof, which has its inner end connected to the main frame by the axis e, or an equivalent thereof, and having no other axis than these two between the main frame and this shoe, for the purposes specified.

5th, In combination with the main frame of a harvester and with the shoe, M, or an equivalent thereof, which is constructed with the guide way, i, the horizontal slot, k, and the projections, l l, fitted to receive the axial bolt, e, or equivalents of these parts, the skeleton coupling frame, F, or an equivalent thereof, made of separate parts, for the purposes specified.

19,699.—ROTARY PUMP.—Dated March 23, 1858; reissue 3,190.—Jacob O. Joyce, Dayton, Ohio.

I claim, 1st, The exit valve chamber, I, when located wholly within the curved cylinder, A, and held in place by beads or projections fitting annular grooves of the curved cylinder, substantially as and for the purposes specified.

2d, The centrally located shaft or bearing, B, arm, D, and the two arms, E, provided at their ends with pistons or plungers, in combination with the annular chamber, A, provided with the centrally interposed valve chamber, I, so arranged that they can be operated by suitable levers or shafts located outside of the cylinder, substantially as and for the purposes specified.

36,159.—SEEDING MACHING.—Dated Aug. 12, 1862; reissue 3,191.—Wm. M. Jones and D. W. Hall, Horicon, Wis., assignees by mesne assignments of W. M. Jones and S. E. Tyler.

We claim, 1st, The cylinder, I, with buckets, k, attached, secured to a rotating and sliding or longitudinally adjustable shaft, E, in combination with the head, J, and semi-cylinder, K, provided with an opening, l, all being arranged within a suitable box, D, and in such relation to a seed box or hopper C, as to operate in the manner and for the purpose substantially as described.

2d, The curved plate or gate, L, placed or fitted within the semi-cylinder, K, connected to the cylinder, I, and arranged in relation with the opening, l, of said semi-cylinder K, and the buckets, k, to operate substantially as and for the purpose specified.

3d, The arrangement of the clutch, F, collar, pinion, f, and shaft, E, substantially as shown and described, for the combined purpose of permitting said shaft to be thrown in and out of gear with the wheel, B', and also permitting said shaft to be adjusted longitudinally when desired.

4th, The combination and arrangement of the cylinder, I, with the buckets k, arranged to traverse through the disk or head, J, for the purpose of increasing or diminishing the rate of feeding or the length of the buckets, substantially as described.

5th, The collar, e, and pinion, f, arranged in relation to the hub plate, N, and clutch, F, substantially as and for the purpose specified.

22,990.—MOP HEAD.—Dated Feb. 15, 1859; reissue 3,192.—Luke Taylor, Springfield, Vt.

I claim, 1st, In a mop head in which the cross head or stationary jaw is attached permanently and immovably to the handle, operating the movable jaw or binder by means of a screw fitted to the handle, and having its screw thread on its exterior, in combination with a nut encompassing the screw and connected with the movable jaw, so as to operate substantially in the manner as shown or described.

2d, Operating the movable jaw by means of the loose screw collar, C, revolving between the nut, D, and the handle, A, substantially as described.

DESIGNS

3,228.—BLIND HINGE.—Hardy N. Baker (assignor to Benj. B. Washburn), Boston, Mass.

3,229.—VAPOR BURNER.—Peter Baumgras, Washington, D. C., assignor to Geo. W. Thomson.

3,230 and 3,231.—WELL CURB.—David Benson, Nanuet, N.Y. Two patents.

3,232.—TRADE MARK.—Alfred Berney, Jersey City, N. J.

3,233.—TRADE MARK.—Amory Edwards, Elizabeth, N. J., assignor to Union Metallic Cartridge Company, Bridgeport, Conn.

3,234.—ORNAMENTS OF A STOVE.—James Spear, Philadelphia, Pa.

3,235.—BRANCHES OF A GASOLIER.—James F. Travis, New York city.

EXTENSIONS.

WARMING HOUSES BY STEAM.—Stephen J. Gold, Cornwall, Conn.—Letters Patent No. 11,747, dated Oct. 3, 1854.

I claim, 1st, The combination of generator, radiator, and condenser, as herein described, for the purpose of heating buildings, when the connection between the generator and condenser is perforated as specified, so as to admit of the formation of a hydrostatic column balancing the pressure of steam on the valve, h, and permitting the water from the condensation of the steam to return to the generator, as hereinbefore specified.

2d, The mode of regulating the quantity of steam admitted to the radiator, by means of the o' o', and the tubes constructed and operating as set forth.

3d, The herein described method of producing a steam-tight connection between the plates of the condensing and radiating chambers, E E', by means of a cord packed between the edges of the plates, substantially as set forth.

4th, The securing of the thin metallic sheets forming the chambers, E and E', by depressing and riveting, as shown in fig. 3, for giving the requisite strength to withstand the outward pressure of the steam in a simple and economical manner.

GRINDING SURFACE IN MILLS.—John Ross, Brooklyn, N. Y., administrator of Charles Ross, deceased.—Letters Patent No. 11,811, dated Oct. 17, 1854.

I claim the forming of a grinding surface in mills by lining a cast iron concave with radial segment of burr or other stone, said segments being fitted and secured to their places in the manner herein set forth.

SECURING LAMPS TO LANTERNS.—William Porter, Williamsburg, N. Y.—Letters Patent No. 11,849, dated Oct. 24, 1864.

I claim the above described lantern, constructed substantially as described.

METALLIC HEDDLE.—Jacob Senneff, Philadelphia, Pa.—Letters Patent No. 102, additional (dated July 20, 1852) to Letters Patent No. 8,662, dated Jan. 13, 1852.

I claim casting the eye on the wire which constitutes the heddle, harness or heald through which the warp passes, in the manner and for the purpose set forth, producing a heddle much superior to any other known or used, and which will remove many of the difficulties heretofore experienced in the use of the common twisted wire heddle.

ADDITIONAL CLAIM.

Casting eyes of harness or heddles upon single or multiplied strands of worsted, silk, cotton, thread or other material, in the manner and for the purpose herein set forth.

GRATE BAR.—Samuel Van Syckel, Titusville, Pa.—Letters Patent No. 11,879, dated Oct. 31, 1854; reissue No. 2,980, dated June 9, 1868.

I claim constructing grate bars with pins or projections on one of the sides of the bar, and with corresponding mortises or recesses in the other side whereby the bars can be interlocked and held together, and made self-sustaining throughout their entire length, substantially as described and specified.

ALARM CLOCK.—Jonathan S. Turner, Fair Haven, Conn.—Letters Patent No. 9,123, dated July 13, 1852.

I claim the combination of the double notched cam, I with the locking apparatus, K and L, with their appendages, f m r n i j and q, when used in any kind of time pieces for giving alarms at the time desired, and giving more than one alarm with once winding, when the whole is constructed, arranged, and combined substantially as herein described.

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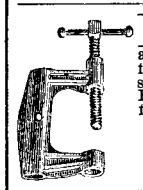

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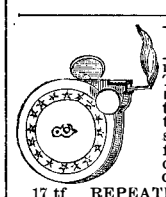

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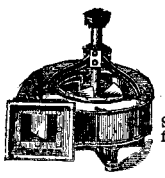

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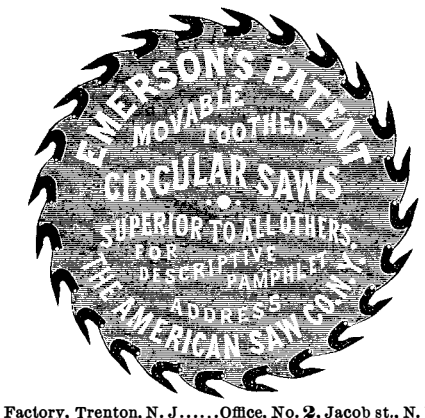

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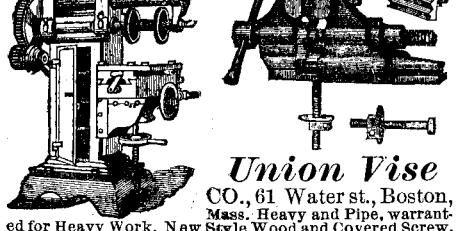

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